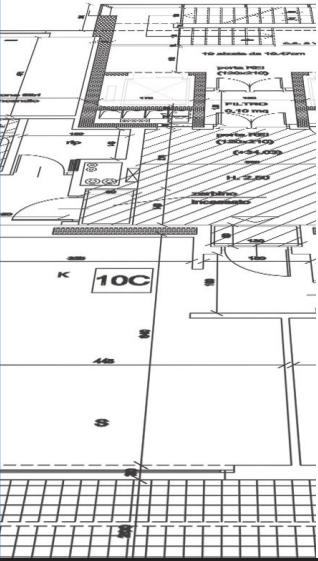


WATERPROOFING OPERATIONS USING DISTILLED BITUMEN POLYMER MEMBRANES



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WATERPROOFING OPERATIONS USING DISTILLED BITUMEN POLYMER MEMBRANES

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0.1 PREPARATION OF THE SUBSTRATE

0.1.1 INSTALLING AND PREPARING FLAT ROOFS Procedure

Before applying a Waterproofing System made from a distilled bitumen polymer membrane, the roof must be checked to make sure it is suitable for use and that it has been prepared correctly.

Reinforced cement and concrete-masonry flat roofs

Reinforced cement and concrete-masonry flat roofs must be dimensioned to withstand the design loads and overloads calculated by a design engineer, and a cement levelling layer must be applied to form a slope (minimum 1%).

To make the substrate suitable for applying the system, the following must be carried out:

- horizontal surfaces must be prepared correctly and levelled;
- vertical surfaces must be prepared correctly and levelled to make them smooth and suitable for applying the various layers of the waterproofing system. If necessary, render the surfaces with cementitious mortar;
- guttering, downpipes, elbows, etc. must be installed;
- all surfaces to be coated must be thoroughly cleaned.

The substrate, therefore, must be smooth, clean and dry and all corners and edges must be smoothed.

Corrugated carbon steel sheet flat roofs

Corrugated carbon steel sheet flat roofs must be dimensioned to withstand the design loads and overloads calculated by a design engineer.

To make the substrate suitable for applying the waterproofing system, the following must be carried out:

- make sure there is continuity between the corrugated sheets and the installation surface. Continuity is guaranteed by using press-formed steel sheet or other suitable means around edges and around protruding elements;
- horizontal surfaces must be prepared correctly and levelled;
- vertical surfaces must be prepared correctly and levelled to make them smooth and suitable for applying the various layers of the waterproofing system;
- guttering, downpipes, elbows, etc. must be installed;
- remove all burrs and sharp edges from the corrugated sheets;
- all surfaces to be coated must be thoroughly cleaned.
- for cold-deck waterproofing systems (with no insulating element), casting a concrete slab of concrete fill may help.

The substrate, therefore, must be smooth, clean and dry and all corners and edges must be smoothed.

Wooden decking flat roofs

Wooden decking flat roofs must be dimensioned to withstand the design loads and overloads calculated by a design engineer.

The wooden decking may be made from planks of deal perfectly butted together, beaded birch planks, plywood panels or oriented strand board (OSB). To fasten the planks and/or panels for the decking to the load-bearing structure and prevent them warping, use special wood screws or deformed shank nails. Fastening the planks or panels in place with traditional nails is not recommended.

To make the substrate suitable for applying the waterproofing system, the following must be carried out:

- make sure there is continuity between the wooden decking and the installation surface. Continuity is guaranteed by using press-formed steel sheet or other suitable means around edges and around protruding elements;
- horizontal surfaces must be prepared correctly and levelled off;
- vertical surfaces must be prepared correctly and levelled off to make them smooth and suitable for applying the various layers of the waterproofing system;
- guttering, downpipes, elbows, etc. must be installed;
- all surfaces to be coated must be thoroughly cleaned.

The substrate, therefore, must be smooth, clean and dry and all corners and edges must be smoothed.

0.1 PREPARATION OF THE SUBSTRATE

0.1.2 INSTALLING AND PREPARING RETAINING WALLS Procedure

Before applying a waterproofing system made from a distilled bitumen polymer membrane, the wall must be checked to make sure it is suitable for use and that it has been prepared correctly.

Retaining wall

The substrate is made up of a reinforced concrete wall dimensioned to withstand the design loads and overloads calculated by a design engineer.

To make the substrate suitable for applying the waterproofing system, the following must be carried out:

- Thoroughly clean the surfaces to be coated and remove any lumps of concrete.
- Level any structural joints.
- Remove all formwork.
- Smooth over any gravel clusters in the cast wall with mortar.
- Form a cementitious mortar shell at the joints between vertical walls and foundation pillars.

The substrate, therefore, must be smooth, clean and dry and all corners and edges must be smoothed.

0.2 WATERPROOFING FLAT ROOFS

0.2.1 WATERPROOFING EXPOSED FLAT ROOFS-COLD-DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A. made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.5**).

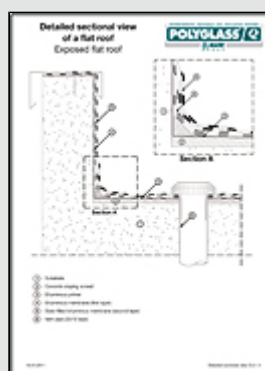
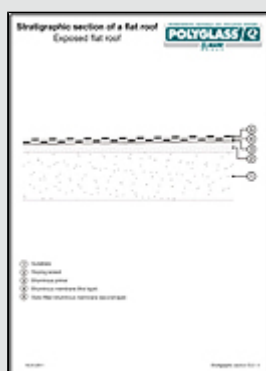
Alternatively, application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.6**).

Alternatively, application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.7**).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4 Mineral** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.10**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond Mineral** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.11**).



0.2 WATERPROOFING FLAT ROOFS

0.2.1.1 Application of the bonding promoter layer using a bituminous primer

Supply and application of a bonding promoter layer by applying a coat of bituminous primer (such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A.). Before applying the bituminous membrane, wait until the primer is completely dry (15-20 hours when applied in the most suitable temperature range).

The product must have the following characteristics:

Density at 20°C:	0.89-0.91 kg/l
Dry solids content at 130°C:	49-51%
Theoretical consumption:	200-350 g/m ²
Drying time at 20°C:	1-2 hours
Frass breaking point temperature of oxidised bitumen:	-10°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.2 Application of the first waterproofing layer using a 4 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Extralight** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.3 Application of the first waterproofing layer using a 4 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Polyflex Light** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.4 Application of the first waterproofing layer using a 4 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane (such as **Elastolight** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 60% (-15%); Transv.: 60% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%); Transv.: 240 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Cold flexibility after thermal ageing according to EN 1109/EN 1296:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.5 Application of the second waterproofing layer using a 5 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Extralight Mineral** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 Standards Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.6 Application of the second waterproofing layer using a 5 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Polyflex Light Mineral** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 Standards Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.7 Application of the second waterproofing layer using a 5 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elastomeric membrane (such as **Elastolight Mineral** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 60% (-15%); Transv.: 60% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%); Transv.: 240 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Cold flexibility after thermal ageing according to EN 1109/EN 1296:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.8 Application of the first waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane (such as **Polyshield TS 4** produced by POLYGLASS S.p.A.), made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Mono-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 40% (-15%); Transv.: 40% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%), Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 140°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.9 Application of the first waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane (such as **Polybond** produced by POLYGLASS S.p.A.), made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 600 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%), Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Resistance to creep at high temperatures according to EN 1110:	≥ 110°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.10 Application of the second waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane (such as **Polyshield TS 4 Mineral** produced by POLYGLASS S.p.A.), made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 Standards Mono-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 40% (-15%); Transv.: 40% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%), Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 140°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.1.11 Application of the second waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond Mineral** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, non-woven, staple-fibre polyester carrier, strengthened and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 600 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%); Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Resistance to creep at high temperatures according to EN 1110:	≥ 110°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2.2 WATERPROOFING EXPOSED FLAT ROOFS-WARM-DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45**

Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A., made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (see section [0.2.2.1](#)).

Insulating layer

Expanded polyurethane panels

Supply and application of an insulating layer comprising expanded polyurethane sandwich panels, such as PUR/VB produced by POLYGLASS S.p.A., with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen (see section [0.2.2.2](#)).

Alternatively, apply expanded Rockwool panels.

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders, such as Fesco-Board S produced by POLYGLASS S.p.A. (see section [0.2.2.3](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.9**).

Application of the second waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.5**).

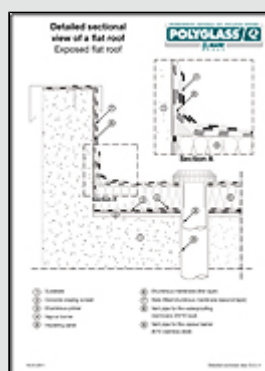
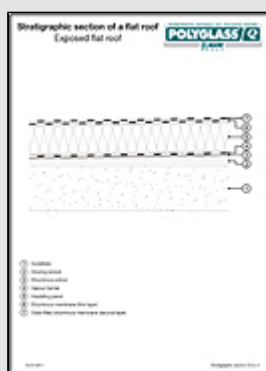
Alternatively, application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.6**).

Alternatively, application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight Mineral** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a slate-filled top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.7**).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4 Mineral** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.10**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond Mineral** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene with a slate-chip top face and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.11**).



0.2 WATERPROOFING FLAT ROOFS

0.2.2.1 Application of a vapour barrier using a 3 mm thick elasto-plastomeric waterproofing membrane

Supply and application of a 3 mm thick vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane (such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A.), made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13970 vapour barriers). The membrane remains flexible at -10°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Continuity of the vapour-proof seal is obtained by overlapping the membrane by at least 10 cm along the sides and 15 cm at the ends, and welding the joints together using a propane gas torch. Hem the vapour barrier on the vertical walls at least 5 cm above the insulating layer and weld them in place. Connect a plastic or metal drainage fitting to the vapour barrier (in EPDM rubber, 20/10 lead or 8/10 stainless steel).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	3 mm
Maximum tensile force according to EN 12311-1:	Long.: 500 N/50 mm (-20%); Transv.: 200 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 30% (-15%); Transv.: 30% (-15%)
Tear strength according to EN 12310-1:	Long.: 100 N (-30%); Transv.: 100 N (-30%)
Water vapour transmission capacity according to EN 1931:	$\mu = 200,000 (\pm 30\%)$
Flexibility at low temperatures according to EN 1109:	$\leq -10^\circ\text{C}$

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.2.2 Application of an insulating layer using expanded polyurethane panels

Supply and application of an insulating layer comprising EXPANDED POLYURETHANE sandwich panels, such as PUR/VB produced by POLYGLASS S.p.A., with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen. Bond the panels in place using bituminous adhesive (such as **Polyfix** produced by POLYGLASS S.p.A.), with metal studs and washers or by shrinking the vapour barrier with a blow torch. Calculate the total thickness of the panel according to current norms and regulations (Law 10/91 and successive modifications according to DLgs 311). Stagger the panels, and make sure they are well butted together to prevent the formation of thermal bridges. If the panels are fixed in place mechanically, the layout of the fasteners must be designed according to local climatic conditions, the height of the roof and the suction force of the wind according to EUROCODE 1 or Ministerial Decree 14.01.2008 "New Technical Norms for Construction Work".

The product must also have the following characteristics:

Compressive strength (10% deformation) according to EN 826:	120 kPa
Thermal conductivity according to EN 12667:	$\lambda;d$ 0.028 W/mK (thickness \leq 60 mm) $\lambda;d$ 0.026 W/mK (thickness $>$ 60 mm)

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.2 WATERPROOFING FLAT ROOFS

0.2.2.3 Application of an insulating layer using expanded Rockwool panels

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders (such as Fesco-Boards produced by POLYGLASS S.p.A.). Bond the panels in place using bituminous adhesive (such as **Polyfix** produced by POLYGLASS S.p.A.), with metal studs and washers or by shrinking the vapour barrier with a blow torch. Calculate the total thickness of the panel according to current norms and regulations (Law 10/91 and successive modifications according to DLgs 311). Stagger the panels, and make sure they are well butted together to prevent the formation of thermal bridges. If the panels are fixed in place mechanically, the layout of the fasteners must be designed according to local climatic conditions, the height of the roof and the suction force of the wind according to EUROCODE 1 or Ministerial Decree 14.01.2008 "New Technical Norms for Construction Work".

The product must also have the following characteristics:

Compressive strength (10% deformation) according to EN 826:	≥ 200 kPa
Thermal conductivity according to EN 13169:	$\lambda; d 0.050$ W/mK

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.1 WATERPROOFING EXPOSED FLAT ROOFS-COLD-DECK SYSTEM APPLIED ON WOODEN, REINFORCED CEMENT OR CONCRETE-MASONRY FLAT ROOFS Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and wooden flat roofs (see section [0.1.1](#)).
When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

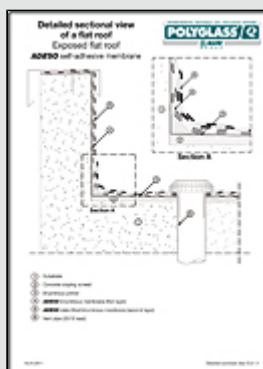
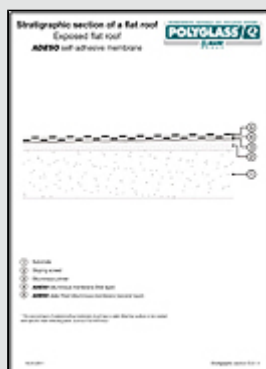
Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, stabilised with parallel glass strands (see section [0.3.1.1](#)).
Alternatively, supply and application of a waterproofing layer comprising a 2 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (APP) elasto-plastomeric resin and a non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.3.1.2](#)).

Application of the second waterproofing layer

Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a self-adhesive, prefabricated, professional-grade, waterproof membrane with a weight of 3.5 kg/m², such as **Elastoflex SA P Mineral** from the ADESO range produced by POLYGLASS S.p.A., manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPE (SBS) elastomeric resin and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.3.1.3](#)).
Alternatively, supply and application of a waterproofing layer comprising a self-adhesive, prefabricated, professional-grade, waterproof membrane with a weight of 3.5 kg/m², such as **Spider P Mineral** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPP (APP) elasto-plastomeric resin with a slate-chip top face and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.3.1.4](#)).



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.1.1 Application of the first waterproofing layer with a 2 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 2 mm thick self-adhesive, prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, strengthened and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -20°C, and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	2 mm
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 130 N (-30%)
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.1.2 Application of the first waterproofing layer using a 2 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 2 mm thick self-adhesive, prefabricated, professional-grade, waterproof membrane (such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A.), manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPP (APP) elasto-plastomeric resin and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -10°C, and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	2 mm
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 130 N (-30%)
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.1.3 Application of the second waterproofing layer using a 3.5 kg/m² elastomeric membrane

Supply and application of a waterproofing layer comprising a 3.5 kg/m² self-adhesive, prefabricated, professional-grade, waterproof membrane (such as **Elastoflex SA P Mineral** from the ADESO range produced by POLYGLASS S.p.A.), manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPE (SBS) elastomeric resin with a slate-chip top face and a non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Multi-layer). The membrane remains flexible at -20°C, and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Mass per unit area according to EN 1849-1:	3.5 kg/m ²
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 140 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Flexibility at low temperatures after thermal ageing according to EN 1109/EN 1296:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.1.4 Application of the second waterproofing layer using a 3.5 kg/m² elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 3.5 kg/m² self-adhesive, prefabricated, professional-grade, waterproof membrane (such as **Spider P Mineral** from the ADESO range produced by POLYGLASS S.p.A.), manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPP (APP) elasto-plastomeric resin with a slate-chip top face and a non-woven, staple-fibre polyester carrier, strengthened and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Multi-layer). The membrane remains flexible at -10°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Mass per unit area according to EN 1849-1:	3.5 kg/m ²
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 140 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3.2 WATERPROOFING FLAT ROOFS-WARM-DECK SYSTEM APPLIED ON WOODEN, REINFORCED CEMENT OR CONCRETE-MASONRY FLAT ROOFS Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane, such as **Polyvap SA** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with SBS elastomeric resin with a 0.06 mm thick aluminium foil carrier (see section [0.3.2.1](#)).

Insulating layer

Expanded polystyrene panels

Supply and application of rigid insulation panels made from sintered expanded polystyrene (EPS 150 kPa) suitable for flat roofs (see section [0.3.2.2](#)).

Alternatively, apply extruded polystyrene foam panels.

Supply and application of rigid insulation panels made from extruded polystyrene foam (XPS 300 kPa) with minimum water absorption, suitable for flat roofs (see section [0.3.2.3](#)).

Application of the first waterproofing layer

Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, stabilised with parallel glass strands (see section [0.3.1.1](#)).

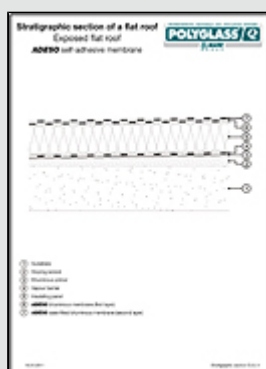
Alternatively, supply and application of a waterproofing layer comprising a 2 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (APP) elasto-plastomeric resin and a non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.3.1.2](#)).

Application of the second waterproofing layer

Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a self-adhesive, prefabricated, professional-grade, waterproof membrane with a weight of 3.5 kg/m², such as **Elastoflex SA P Mineral** from the ADESO range produced by POLYGLASS S.p.A., manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPE (SBS) elastomeric resin and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.3.1.3**).

Alternatively, supply and application of a waterproofing layer comprising a self-adhesive, prefabricated, professional-grade, waterproof membrane with a weight of 3.5 kg/m², such as **Spider P Mineral** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPP (APP) elasto-plastomeric resin with a slate-chip top face and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass threads (see section **0.3.1.4**).



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.2.1 Application of a vapour barrier using a 2 mm thick elastomeric waterproofing membrane

Supply and application of a vapour barrier comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane (such as **Polyvap SA** from the ADESO range produced by POLYGLASS S.p.A.), manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with SBS elastomeric resin with a 0.06 mm thick aluminium carrier (produced according to

EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13970 vapour barriers). The membrane remains flexible at -25°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane full contact over the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the vapour barrier on the vertical walls at least 5 cm above the insulating layer and weld them in place. Remove the mono-silicon film from the upper face during application of the insulating panels or insulating system.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	2 mm
Maximum tensile force according to EN 12311-1:	Long.: 500 N/50 mm (-20%); Transv.: 200 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 4% (-2%); Transv.: 4% (-2%)
Tear strength according to EN 12310-1:	Long.: 100 N (-30%); Transv.: 100 N (-30%)
Water vapour transmission capacity according to EN 1931:	$\mu = 700,000 (\pm 30\%)$
Flexibility at low temperatures according to EN 1109:	$\leq -25^\circ\text{C}$

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.2.2 Application of an insulating layer using expanded polystyrene panels

Supply and application of 150 kPa rigid, self-extinguishing, dimensionally-stable insulation panels suitable for flat roofs, made from sintered expanded polystyrene. The panels must be made from non-recycled, virgin raw materials with CE certification in compliance with EN 13163 standards.

The product must have the following characteristics:

Definition according to EN 13163:	EPS 150
Thermal conductivity according to EN 13163:	$\lambda;d$ 0.035 W/mK
Compressive strength (10% deformation) according to EN 826:	150 kPa
Fire resistance class according to EN 13501-1:	Euroclass E
Approximate density:	25 kg/m ³

Bond the panels in place and make sure they are well butted together to prevent the formation of thermal bridges.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.3 WATERPROOFING EXPOSED FLAT ROOFS-ADESO SYSTEM

0.3.2.3 Application of an insulating layer using extruded polystyrene foam panels

Supply and application of rigid insulation panels butted together on all four sides, made from self-extinguishing, dimensionally-stable, extruded polystyrene foam (XPS 300 kPa) with minimum water absorption, suitable for flat roofs. The panels must be made from non-recycled, virgin raw materials with EC certification in compliance with EN 13164 standards.

The product must have the following characteristics:

Definition according to EN 13164:	XPS 300
Thermal conductivity according to EN 13164:	$\lambda;d$ 0.035 W/mK
Compressive strength (10% deformation) according to EN 826:	300 kPa
Fire resistance class according to EN 13501-1:	Euroclass E
Approximate density:	35 kg/m ³

Bond the panels in place and make sure they are well butted together to prevent the formation of thermal bridges.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING-COLD DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.1**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

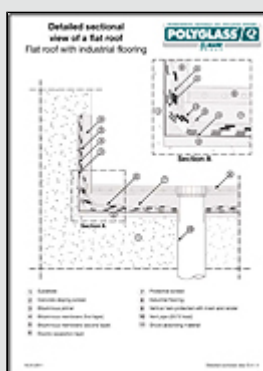
Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Installation of industrial flooring

Installation of flooring suitable for foot traffic/vehicles on a cementitious screed dimensioned by a design engineer to withstand the design loads and overloads to which it will be subjected without fracturing, both during site operations and when in service (see section **0.4.1.7**).



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.1 Application of the second waterproofing layer using a 4 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Extralight** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to

EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. If the membrane is not applied underneath a heavy protective layer (flooring, garden soil, etc.), it must be protected with a coat of special heat-reflecting, protective paint (such as **Polyver Alu** produced by POLYGLASS S.p.A.).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.2 Application of the second waterproofing layer using a 4 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane (such as **Polyflex Light** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. If the membrane is not applied underneath a heavy protective layer (flooring, garden soil, etc.), it must be protected with a coat of special heat-reflecting, protective paint (such as **Polyver Alu** produced by POLYGLASS S.p.A.).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 800 N/50 mm (-20%); Transv.: 600 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.3 Application of the second waterproofing layer using a 4 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane (such as **Elastolight** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified “ISO 9001” and “UNI EN ISO 14001:2004” Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. If the membrane is not applied underneath a heavy protective layer (flooring, garden soil, etc.), it must be protected with a coat of special heat-reflecting, protective paint (such as **Polyver Alu** produced by POLYGLASS S.p.A.).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 60% (-15%); Transv.: 60% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%); Transv.: 240 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 1000 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Cold flexibility after thermal ageing according to EN 1109/EN 1296:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.4 Application of the second waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane (such as **Polyshield TS 4** produced by POLYGLASS S.p.A.), made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to CE-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Mono-layer or Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. If the membrane is not applied underneath a heavy protective layer (flooring, garden soil, etc.), it must be protected with a coat of special heat-reflecting, protective paint (such as **Polyver Alu** produced by POLYGLASS S.p.A).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 750 N/50 mm (-20%); Transv.: 550 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 40% (-15%); Transv.: 40% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%), Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 140°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.5 Application of the second waterproofing layer using a 4 mm thick membrane

Supply and application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane (such as **Polybond** produced by POLYGLASS S.p.A.), made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to CE-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. If the membrane is not applied underneath a heavy protective layer (flooring, garden soil, etc.), it must be protected with a coat of special heat-reflecting, protective paint (such as **Polyver Alu** produced by POLYGLASS S.p.A).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 600 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%), Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Resistance to creep at high temperatures according to EN 1110:	≥ 110°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.6 Application of the separation layer

Supply and application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps. Around the perimeter of protruding elements, insert compressible, expanded polystyrene around 15 mm thick (such as IPO 80÷100) under the vertical overlaps in the polyethylene sheets, to facilitate thermal expansion of the flooring without it contrasting with the membrane forming the vertical overlaps.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.1.7 Installation of industrial flooring on a concrete screed

Supply and application of flooring suitable for foot traffic/vehicles on a cementitious screed dimensioned by a design engineer to resist the static loads and dynamic stress to which it will be subjected without fracturing, both during site operations and when in service.

If required, embed a layer of reinforcement in the screed (electro-welded mesh or synthetic mesh/fibres). The cementitious screed must have a suitable wear layer thick enough for purpose made from bituminous binder.

Install the flooring and reinforcement carefully, if required, to avoid damaging the underlying waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.4 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING

0.4.2 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH INDUSTRIAL FLOORING-WARM DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A., made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (see section [0.2.2.1](#)).

Insulating layer

Expanded polyurethane panels

Supply and application of an insulating layer comprising expanded polyurethane sandwich panels (such as PUR/VB produced by POLYGLASS S.p.A.), with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen (see section [0.2.2.2](#)).

Alternatively, apply expanded Rockwool panels.

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders, such as Fesco-Board S produced by POLYGLASS S.p.A. (see section [0.2.2.3](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.1**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

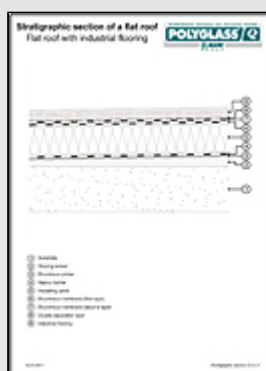
Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Installation of industrial flooring

Installation of flooring suitable for foot traffic/vehicles formed by a cementitious screed dimensioned by a design engineer to withstand the static loads and dynamic stress to which it will be subjected without fracturing, both during site operations and when in service (see section **0.4.1.7**).



0.5.1 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH TILED FLOORING-COLD DECK SYSTEM
Procedura**Preparation of substrates**

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section **0.1.1**).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section **0.2.1.1**).

Application of the first waterproofing layer***Reoxthene Ultralight Technology* waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.3**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.4**).

***TRADITIONAL* waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.8**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.9**).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.1**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

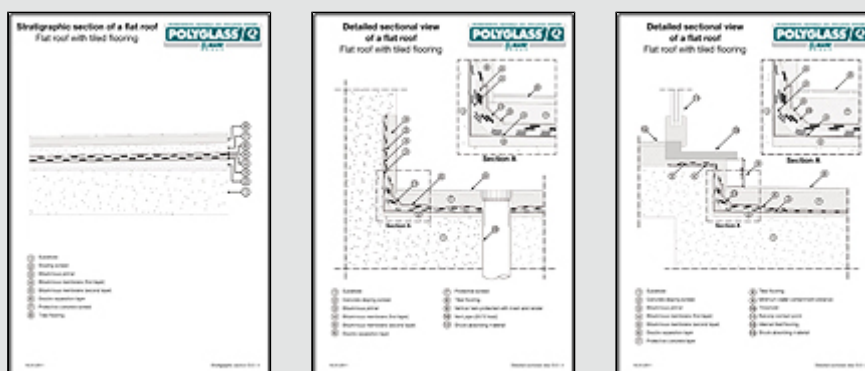
Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Application of the mechanical protection layer

Application of a layer to mechanically protect the waterproofing system, by casting concrete with a suitable grain size to form a layer around 5-6 cm thick (see section **0.5.1.1**).

Installation of tiled flooring

Installation of flooring suitable for foot traffic made from frost-proof tiles for external use as specified by a design engineer. Install the tiles on the cementitious substrate prepared accordingly using specific adhesive (see section **0.5.1.2**).



0.5 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH TILED FLOORING

0.5.1.1 Mechanical protection layer

Supply and application of a layer to mechanically protect the waterproofing system, by casting concrete with a suitable grain size to form a layer around 5-6 cm thick.

The size of the layer must be calculated by a design engineer to withstand the static loads and dynamic stress to which it will be subjected without fracturing, both during site operations and when in service.

If required, embed a layer of reinforcement in the screed (electro-welded mesh or synthetic mesh/fibres).

Apply the protective layer and reinforcement carefully, where required, to avoid damaging the underlying waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.5 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH TILED FLOORING

0.5.1.2 Layer of tiled flooring

Supply and installation of flooring suitable for foot traffic made from frost-proof tiles for external use as specified by a design engineer.

Install the tiles on the cementitious substrate prepared accordingly using specific adhesive. Form expansion joints in the flooring if required.

Install the flooring carefully to avoid damaging the underlying waterproofing system.

.....(€/m²)

0.5.2 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH TILED FLOORING-WARM DECK SYSTEM

Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A., made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (see section [0.2.2.1](#)).

Insulating layer

Expanded polyurethane panels

Supply and application of an insulating layer comprising expanded polyurethane sandwich panels (such as PUR/VB produced by POLYGLASS S.p.A.), with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen (see section [0.2.2.2](#)).

Alternatively, apply expanded Rockwool panels.

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders, such as Fesco-Board S produced by POLYGLASS S.p.A. (see section [0.2.2.3](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.1**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

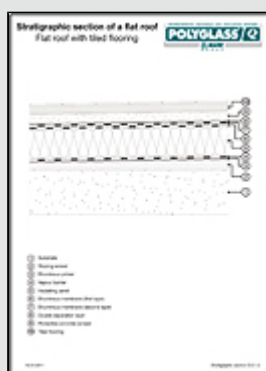
Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Application of the mechanical protection layer

Application of a layer to mechanically protect the waterproofing system, by casting concrete with a suitable grain size to form a layer around 5-6 cm thick (see section **0.5.1.1**).

Installation of the tiled flooring

Installation of flooring suitable for foot traffic made from frost-proof tiles for external use as specified by a design engineer. Install the tiles on the cementitious substrate prepared accordingly using specific adhesive (see section **0.5.1.2**).



0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1 IMPERMEABLE WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH-COLD DECK SYSTEM

Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Alternatively, application of a waterproofing layer comprising a 5 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Hp** Light produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with an ultra-heavyweight, spun-bound, non-woven polyester carrier (see section [0.6.1.1](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 5 mm thick, prefabricated, professional-grade membrane, such as **Polybond HP** produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPP (APP) polypropylene with an ultra-heavyweight, spun-bound, non-woven polyester carrier (see section [0.6.1.2](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

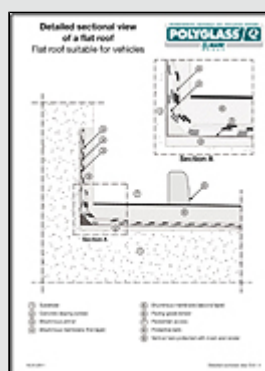
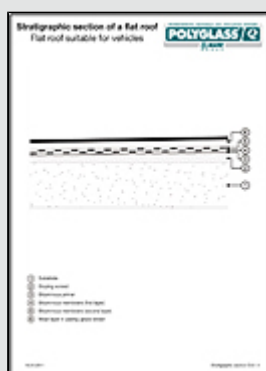
Alternatively, application of a waterproofing layer comprising a 5 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Hp** Light produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with an ultra-heavyweight, spun-bound, non-woven polyester carrier (see section [0.6.1.3](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 5 mm thick, prefabricated, professional-grade membrane, such as **Polybond HP** produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPP (APP) polypropylene with an ultra-heavyweight, spun-bound, non-woven polyester carrier (see section [0.6.1.4](#)).

Installation of flooring suitable for vehicles with paving-grade binder

Installation of flooring suitable for vehicles made from paving-grade binder and a wear layer, according to dimensions calculated by a design engineer to withstand the static loads and dynamic stress to which it will be subjected without fracturing, both during site operations and when in service (see section [0.6.1.5](#)).



0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1.1 Application of the first waterproofing layer using a 5 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric, waterproof membrane (such as **Polyflex HP** Light produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with an ultra-heavyweight, spun-bound, non-woven polyester carrier (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707, 14695 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 1200 N/50 mm (-20%); Transv.: 1000 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%); Transv.: 200 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.5%
Impact resistance according to EN 12691-A:	≥ 1750 mm
Static load resistance according to EN 12730-A:	≥ 30 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1.2 Application of the first waterproofing layer with a 5 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, waterproof membrane (such as PolybondHP produced by POLYGLASS S.p.A.), made from distilled bitumen modified with BPP (APP) polypropylene with an ultra-heavyweight, spun-bound, non-woven polyester carrier (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707, 14695 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 1200 N/50 mm (-20%) Transv.: 1000 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%) Transv.: 200 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.5%
Impact resistance according to EN 12691-A:	≥ 1750 mm
Static load resistance according to EN 12730-A:	≥ 30 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Softening point according to EN 1427:	> 140°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1.3 Application of the second waterproofing layer using a 5 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, elasto-plastomeric, waterproof membrane (such as **Polyflex HP** Light produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with an ultra-heavyweight, spun-bound, non-woven polyester carrier (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707, 14695 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -20°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 1200 N/50 mm (-20%); Transv.: 1000 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%); Transv.: 200 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.5%
Impact resistance according to EN 12691-A:	≥ 1750 mm
Static load resistance according to EN 12730-A:	≥ 30 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 140°C
Resistance to creep after thermal ageing according to EN 1110/EN 1296:	≥ 130°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1.4 Application of the second waterproofing layer with a 5 mm thick plastomeric membrane

Supply and application of a waterproofing layer comprising a 5 mm thick prefabricated, professional-grade, waterproof membrane (such as **Polybond HP** produced by POLYGLASS S.p.A.), made from distilled bitumen modified with BPP (APP) polypropylene with an ultra-heavyweight, spun-bound, non-woven polyester carrier (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707, 14695 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	5 mm
Maximum tensile force according to EN 12311-1:	Long.: 1200 N/50 mm (-20%) Transv.: 1000 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 50% (-15%); Transv.: 50% (-15%)
Tear strength according to EN 12310-1:	Long.: 200 N (-30%) Transv.: 200 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.5%
Impact resistance according to EN 12691-A:	≥ 1750 mm
Static load resistance according to EN 12730-A:	≥ 30 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Softening point according to EN 1427:	> 140°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.6 WATERPROOFING SYSTEMS FOR FLAT ROOFS SUITABLE FOR VEHICLES WITH A PAVING-GRADE BINDER FINISH

0.6.1.5 Installation of flooring suitable for vehicles with paving-grade binder and a wear layer

Supply and installation of flooring suitable for vehicles made from paving-grade binder and a wear layer, according to dimensions calculated by a design engineer to withstand the static loads and dynamic stress to which it will be subjected without fracturing, both during site operations and when in service.

Apply the flooring carefully to avoid damaging the underlying waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.7 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL (NOT ACCESSIBLE)

0.7.1 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL-COLD DECK SYSTEM

Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.4.1.1](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

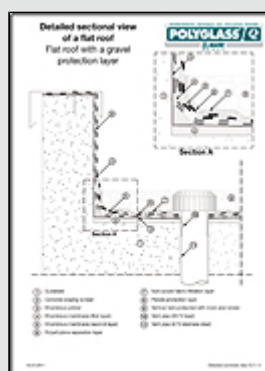
Application of a separation and slip layer in polyethylene at least 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.7.1.1**).

Application of the protection layer in non-woven fabric

Application of a protection layer made from 100% non-woven, needle-punched polypropylene fabric with a weight of 300 g/m², such as **Polydren 300** PP produced by POLYGLASS S.p.A. (see section **0.7.1.2**).

Application of the gravel protection layer

Application of a protection layer for the membrane, made from washed, round gravel with a grain size of 16 to 32 mm (see section **0.7.1.3**).



0.7 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL (NOT ACCESSIBLE)

0.7.1.1 Application of the separation layer

Supply and application of a separation and slip layer in polyethylene at least 0.30 mm thick, loose-laid on the previous layer with large overlaps.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.7 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL (NOT ACCESSIBLE)

0.7.1.2 Application of the protection layer in non-woven fabric

Supply and application of a protection layer made from 100% non-woven, needle-punched polypropylene fabric with a weight of 300 g/m² (such as **Polydren 300** PP produced by POLYGLASS S.p.A.).

The material must have the following characteristics:

Average tensile strength according to EN ISO 10319:	7 (-13%) kN/m
Average elongation at maximum load according to EN ISO 10319:	> 50%
Static puncture resistance CBR according to EN ISO 12236:	1.0 (-10%) kN
Mass per unit area according to EN ISO 9864:	300 (-10%) g/m ²
Flow capacity normal to the surface according to EN ISO 11058:	40 (-30%) l/m ² s

Loose-lay the product and overlap the edges of adjacent sheets by approximately 10 cm.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.7 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL (NOT ACCESSIBLE)

0.7.1.3 Gravel protection layer

Supply and application of a protection layer for the membrane, made from washed, round gravel with a grain size of 16 to 32 mm.

We recommend applying an even layer at least 50 mm thick. Apply the protection layer carefully to avoid damaging the underlying waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.7 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL (NOT ACCESSIBLE)

0.7.2 WATERPROOFING SYSTEMS FOR FLAT ROOFS WITH PROTECTIVE GRAVEL-WARM DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A., made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (see section [0.2.2.1](#)).

Insulating layer

Expanded polyurethane panels

Supply and application of an insulating layer comprising expanded polyurethane sandwich panels (such as PUR/VB produced by POLYGLASS S.p.A.), with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen (see section [0.2.2.2](#)).

Alternatively, apply expanded Rockwool panels.

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders, such as Fesco-Board S produced by POLYGLASS S.p.A. (see section [0.2.2.3](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.1**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, strengthened and stabilised with parallel glass strands (see section **0.4.1.3**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.4**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.4.1.5**).

Application of the separation layer

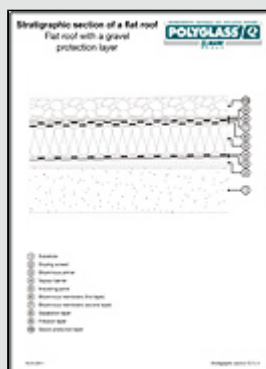
Application of a separation and slip layer in polyethylene at least 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.7.1.1**).

Application of the protection layer in non-woven fabric

Application of a protection layer made from 100% non-woven, needle-punched polypropylene fabric with a weight of 300 g/m², such as **Polydren 300** PP produced by POLYGLASS S.p.A. (see section **0.7.1.2**).

Application of the gravel protection layer

Application of a protection layer for the membrane, made from washed, round gravel with a grain size of 16 to 32 mm (see section **0.7.1.3**).



0.8.1 WATERPROOFING ROOF GARDENS Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section **0.1.1**).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section **0.2.1.1**).

Application of the first waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.2**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.3**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.4**).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.8**).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.2.1.9**).

Application of the second waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Antiradice P LIGHT** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a staple-fibre polyester carrier spun-bound with Johns Manville DuraSpun XTR, stabilised and reinforced with parallel glass strands (see section **0.8.1.1**).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade membrane, such as **Antiradice PE** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and LANXESS Preventol B2 additive with a heavyweight, spun-bound, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.8.1.2**).

Application of the separation layer

Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Application of the mechanical protection layer

Application of a layer to mechanically protect the waterproofing system, by casting concrete with a suitable grain size to form a layer around 5-6 cm thick (see section **0.5.1.1**).

Application of the gravel drainage layer

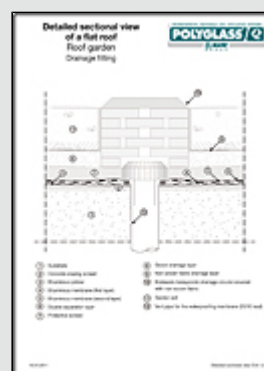
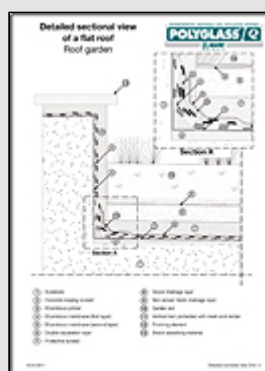
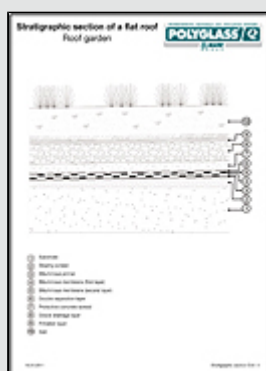
Application of an even drainage layer for roof gardens, made from washed, round gravel with a grain size of 16 to 32 mm, thickness as specified by a design engineer (see section **0.8.1.3**).

Application of the filtration layer in non-woven fabric

Application of a filtration layer made from 100% non-woven, needle-punched polyester fabric with a weight of 200 g/m², such as Polydren PES 200 produced by POLYGLASS S.p.A. (see section **0.8.1.4**).

Application of the layer of soil

Application of an even layer of soil suitable for roof gardens, type and quantity as specified by a design engineer (see section **0.8.1.5**).



0.8 WATERPROOFING ROOF GARDENS

0.8.1.1 Application of the second waterproofing layer with a 4 mm thick membrane resistant to plant roots

Supply and application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, (such as **Antiradice P LIGHT** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a staple-fibre polyester carrier spun-bound with Johns Manville DuraSpun XTR, stabilised and reinforced with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 Standards Multi-layer). The membrane remains flexible at -15°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. The membrane must be applied underneath a heavy protective layer (ROOF GARDEN).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 600 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%); Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -15°C
Resistance to creep at high temperatures according to EN 1110:	≥ 110°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.8 WATERPROOFING ROOF GARDENS

0.8.1.2 Application of the second waterproofing layer with a 4 mm thick membrane resistant to plant roots

Supply and application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade membrane, such as **Antiradice PE** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and LANXESS Preventol B2 additive with a heavyweight, spun-bound, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -10°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane).

Apply the membrane in full adherence with the previous layer, with overlaps of at least 10 cm along the sides and 15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. The membrane must be applied underneath a heavy protective layer (ROOF GARDEN).

The product must also have the following characteristics:

Length according to EN 1848-1:	10 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	4 mm
Maximum tensile force according to EN 12311-1:	Long.: 600 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 150 N (-30%); Transv.: 150 N (-30%)
Dimensional stability according to EN 1107-1:	≤ 0.3%
Impact resistance according to EN 12691-A:	≥ 900 mm
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 110°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.8 WATERPROOFING ROOF GARDENS

0.8.1.3 Application of the gravel drainage layer

Supply and application of an even drainage layer for roof gardens, made from washed, round gravel with a grain size of 16 to 32 mm, thickness as specified by a design engineer. Apply the drainage layer carefully to avoid damaging the underlying waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.8 WATERPROOFING ROOF GARDENS

0.8.1.4 Application of the filtration layer in non-woven fabric

Supply and application of a filtration layer made from 100% non-woven, needle-punched polyester fabric with a weight of 200 g/m² (such as Polydren PES 200 produced by POLYGLASS S.p.A.).

The product must also have the following characteristics:

Longitudinal tensile strength according to EN ISO 10319:	3.4 kN/m
Transversal tensile strength according to EN ISO 10319:	5.4 kN/m
Longitudinal elongation at maximum load according to EN ISO 10319:	100%
Transversal elongation at maximum load according to EN ISO 10319:	100%
Static puncture resistance CBR according to EN ISO 12236:	0.8 kN
Root penetration resistance (cone drop test) according to EN ISO 13433:	26 mm

Loose-lay the product and overlap the edges of adjacent sheets by approximately 10 cm.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.8 WATERPROOFING ROOF GARDENS

0.8.1.5 Application of the layer of soil

Supply and application of an even layer of soil suitable for roof gardens, type and quantity as specified by a design engineer. We also recommend forming gravel drainage channels around the perimeter of the roof.

Apply the layer of soil carefully to avoid damaging the underlying waterproofing layer.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.8.2 WATERPROOFING ROOF GARDENS-WARM-DECK SYSTEM Procedure

Preparation of substrates

Preparation of reinforced concrete, concrete-masonry and corrugated carbon steel sheet substrates (see section [0.1.1](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the vapour barrier

Supply and application of a vapour barrier comprising a prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyvap Radonshield** 3 mm produced by POLYGLASS S.p.A., made from polypropylene-modified bitumen with a 0.06 mm thick aluminium foil carrier laminated with a reinforced glass fibre mat (see section [0.2.2.1](#)).

Insulating layer

Expanded polyurethane panels

Supply and application of an insulating layer comprising expanded polyurethane sandwich panels (such as PUR/VB produced by POLYGLASS S.p.A.), with one side in poly-coated glass fibre mat and the other side in glass fibre mat saturated with bitumen (see section [0.2.2.2](#)).

Alternatively, apply expanded Rockwool panels.

Supply and application of an insulating layer comprising panels made from expanded Rockwool, cellulose fibres and asphalt binders, such as Fesco-Board S produced by POLYGLASS S.p.A. (see section [0.2.2.3](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elasto-plastomeric membrane, such as **Extralight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.2](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Polyflex Light** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.3](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade, elastomeric membrane, such as **Elastolight** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.4](#)).

TRADITIONAL **waterproofing membrane**

Application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polyshield TS 4** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.8](#)).

Alternatively, application of a waterproofing layer comprising a 4 mm thick prefabricated, professional-grade membrane, such as **Polybond** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and a heavyweight, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.2.1.9](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Alternatively, application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade, elasto-plastomeric membrane, such as **Antiradice P LIGHT** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a staple-fibre polyester carrier spun-bound with Johns Manville DuraSpun XTR, stabilised and reinforced with parallel glass strands (see section **0.8.1.1**).

TRADITIONAL waterproofing membrane

Application of a waterproofing layer comprising a 4 mm thick, prefabricated, professional-grade membrane, such as **Antiradice PE** produced by POLYGLASS S.p.A., made from distilled bitumen with BPP (APP) polypropylene and LANXESS Preventol B2 additive with a heavyweight, spun-bound, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section **0.8.1.2**).

Application of the separation layer

Application of a double separation and slip layer in polyethylene at least 30 mm + 0.30 mm thick, loose-laid on the previous layer with large overlaps (see section **0.4.1.6**).

Application of the mechanical protection layer

Application of a layer to mechanically protect the waterproofing system, by casting concrete with a suitable grain size to form a layer around 5-6 cm thick (see section **0.5.1.1**).

Application of the gravel drainage layer

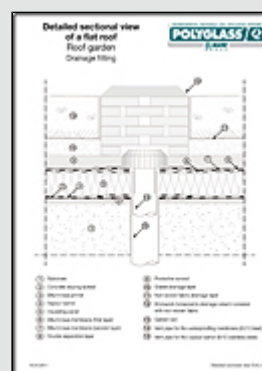
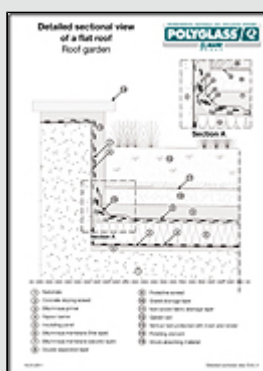
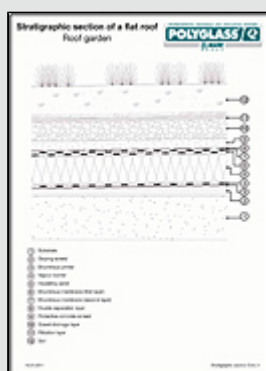
Application of an even drainage layer for roof gardens, made from washed, round gravel with a grain size of 16 to 32 mm, thickness as specified by a design engineer (see section **0.8.1.1**).

Application of the filtration layer in non-woven fabric

Application of a filtration layer made from 100% non-woven, needle-punched, polyester fabric with a weight of 200 g/m², such as Polydren PES 200 produced by POLYGLASS S.p.A. (see section **0.8.1.2**).

Application of the layer of soil

Application of an even layer of soil suitable for roof gardens, type and quantity as specified by a design engineer (see section **0.8.1.3**).



0.9 WATERPROOFING RETAINING WALLS

0.9.1 WATERPROOFING RETAINING WALLS Procedure

Preparation of substrates

The substrate is made up of a reinforced concrete wall dimensioned to withstand the loads and overloads calculated by a design engineer (see section [0.1.2](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

Application of a waterproofing layer comprising a 3 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Easy Lift** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.9.1.1](#)).

Application of the second waterproofing layer

Reoxthene Ultralight Technology waterproofing membrane

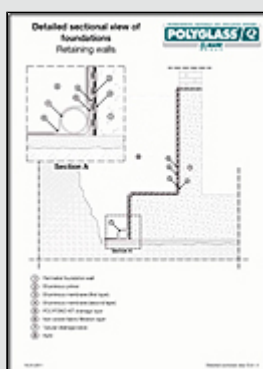
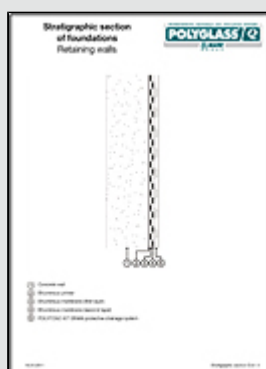
Application of a waterproofing layer comprising a 3 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Easy Lift** produced by POLYGLASS S.p.A., made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.9.1.2](#)).

Application of the protective drainage layer

Application of a protective drainage layer made from high-density HDPE polyethylene combined with white, non-woven, needle-punched polypropylene fabric with a weight of 110 g/m², embossed with truncated cone-shaped studs (such as Polyfond Kit Drain produced by POLYGLASS S.p.A.) (see section [0.9.1.3](#)).

Application of the refill layer

Application of a layer of refill made from soil with no stones, rubble, waste material or any other material which could damage the waterproofing system (see section [0.9.1.4](#)).



0.9 WATERPROOFING RETAINING WALLS

0.9.1.1 Application of the first waterproofing layer with a 3 mm thick plastomeric membrane

Supply and application of a waterproofing layer comprising a 3 mm thick, prefabricated, professional-grade, waterproof membrane (such as **Easy Lift** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -10°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

The product must also have the following characteristics:

Length according to EN 1848-1:	7.5 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	3 mm
Maximum tensile force according to EN 12311-1:	Long.: 700 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 60% (-15%); Transv.: 60% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.9 WATERPROOFING RETAINING WALLS

0.9.1.2 Application of the second waterproofing layer with a 3 mm thick plastomeric membrane

Supply and application of a waterproofing layer comprising a 3 mm thick, prefabricated, professional-grade, waterproof membrane (such as **Easy Lift** produced by POLYGLASS S.p.A.), made from latest-generation *Reoxthene Ultralight Technology* distilled bitumen compound with a heavyweight, spun-bound, non-woven polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Single-layer or Multi-layer). The membrane remains flexible at -10°C and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of the bitumen membrane), and the quality standards of the patented, innovative technology which exceeds previous weight/thickness parameters.

Apply the membrane in full adherence with the previous layer, with overlaps of at least 8-10 cm along the sides and 12-15 cm at the ends, with joints welded together using a light propane gas flame. Hem the membrane along the vertical walls and weld in place.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint. The membrane must be applied underneath a heavy protective layer.

The product must also have the following characteristics:

Length according to EN 1848-1:	7.5 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	3 mm
Maximum tensile force according to EN 12311-1:	Long.: 700 N/50 mm (-20%); Transv.: 500 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 60% (-15%); Transv.: 60% (-15%)
Tear strength according to EN 12310-1:	Long.: 180 N (-30%); Transv.: 220 N (-30%)
Static load resistance according to EN 12730-A:	≥ 15 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.9 WATERPROOFING RETAINING WALLS

0.9.1.3 Application of the protective drainage layer

Supply and application of a protective drainage layer made from high-density HDPE polyethylene combined with white, non-woven, needle-punched polypropylene fabric with a weight of 110 g/m², embossed with truncated cone-shaped studs (such as Polyfond Kit Drain produced by POLYGLASS S.p.A.), to protect the waterproofing system and drainage layer from rainwater. Fasten the layer in place with impact-driven 25 mm zinc-plated nails and washers, and a 200 cm long by 7 cm wide high density HDPE polyethylene edging profile with holes in the upper part every 24.5 cm.

The material must have the following characteristics:

Width:	2 m
Length:	20 m
Number of truncated cone-shaped studs per m ² :	approximately 1,860
Height of stud:	8 mm
Non-woven fabric:	needle-punched polypropylene 110 g/m ²
Drainage capacity:	4.6 l/s/m
Thermal stability:	-40°C/+80°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.9 WATERPROOFING RETAINING WALLS

0.9.1.4 Refill layer

Application of a layer of refill made from soil with no stones, rubble, waste material or any other material which could damage the waterproofing system.

Carefully apply the filler material by hand or with a digger to prevent damaging the waterproofing system.

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)

0.10.1 WATERPROOFING RETAINING WALLS Procedure

Preparation of substrates

The substrate is made up of a reinforced concrete wall dimensioned to withstand the loads and overloads calculated by a design engineer (see section [0.1.2](#)).

When substrates are consigned, they must be smooth, clean and dry with no sharp edges or corners.

Application of the bonding promoter layer

Bonding promoter layer by applying a coat of bituminous primer, such as **Polyprimer HP 45** Professional produced by POLYGLASS S.p.A. (see section [0.2.1.1](#)).

Application of the first waterproofing layer

Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, stabilised with parallel glass strands (see section [0.3.1.1](#)).

Alternatively, supply and application of a waterproofing layer comprising a 2 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (APP) elasto-plastomeric resin and a non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.3.1.2](#)).

Application of the second waterproofing layer

Self-adhesive ADESO waterproofing membrane

Supply and application of a waterproofing layer comprising a 2 mm thick prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, stabilised with parallel glass strands (see section [0.10.1.1](#)).

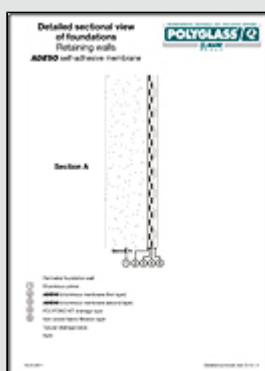
Alternatively, supply and application of a waterproofing layer comprising a 2 mm thick, prefabricated, professional-grade, waterproof membrane, such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A., made from distilled bitumen modified with BPE (APP) elasto-plastomeric resin and a non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (see section [0.10.1.2](#)).

Application of the protective drainage layer

Application of a protective drainage layer made from high-density HDPE polyethylene combined with white, non-woven, needle-punched polypropylene fabric with a weight of 110 g/m², embossed with truncated cone-shaped studs (such as Polyfond Kit Drain produced by POLYGLASS S.p.A.) (see section [0.9.1.3](#)).

Application of the refill layer

Application of a layer of refill made from soil with no stones, rubble, waste material or any other material which could damage the waterproofing system (see section [0.9.1.4](#)).



0.10 WATERPROOFING RETAINING WALLS-ADESO SYSTEM

0.10.1.1 Application of the second waterproofing layer using a 2 mm thick elastomeric membrane

Supply and application of a waterproofing layer comprising a 2 mm thick self-adhesive, prefabricated, professional-grade, waterproof membrane, such as **Elastoflex SA P** from the ADESO range produced by POLYGLASS S.p.A., manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPE (SBS) elastomeric resin and a non-woven, staple-fibre polyester carrier, strengthened and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -20°C, and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	2 mm
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 130 N (-30%)
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -20°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



0.10 WATERPROOFING RETAINING WALLS-ADESO SYSTEM

0.10.1.2 Application of the second waterproofing layer using a 2 mm thick elasto-plastomeric membrane

Supply and application of a waterproofing layer comprising a 2 mm thick self-adhesive, prefabricated, professional-grade, waterproof membrane (such as **Spider P** from the ADESO range produced by POLYGLASS S.p.A.), manufactured using innovative technology to stratify various bituminous mixes, made from distilled bitumen modified with BPP (APP) elasto-plastomeric resin and a spun-bound, non-woven, staple-fibre polyester carrier, reinforced and stabilised with parallel glass strands (produced according to EC-certified "ISO 9001" and "UNI EN ISO 14001:2004" Quality Management Systems, final use according to EN 13707 and 13969 Standards Type T Multi-layer). The membrane remains flexible at -10°C, and is made according to quality standards imposed by N.A.T. (NO AGEING TECHNOLOGY, an innovative production process which controls the ageing process of the polymeric matrix of bituminous membranes).

Apply the membrane in full adherence with the previous layer by removing the mono-silicon film from the self-adhesive side, with overlaps of at least 10 cm along the sides and 15 cm at the ends. The joints are welded together through direct contact of the overlaps. Hem the membrane along the vertical walls and bond the entire hem in place on the walls. Some parts or details of the work may be made easier by pre-heating the membrane with a hot air blower, such as a Leister.

Apply all the rolls forming the 2nd waterproofing layer parallel to the 1st layer, and stagger them lengthways and widthways by at least the width of the welded joint.

The product must also have the following characteristics:

Length according to EN 1848-1:	15 m (-1%)
Width according to EN 1848-1:	1 m (-1%)
Thickness according to EN 1849-1:	2 mm
Maximum tensile force according to EN 12311-1:	Long.: 400 N/50 mm (-20%); Transv.: 300 N/50 mm (-20%)
Tensile elongation according to EN 12311-1:	Long.: 35% (-15%); Transv.: 35% (-15%)
Tear strength according to EN 12310-1:	Long.: 130 N (-30%); Transv.: 130 N (-30%)
Impact resistance according to EN 12691-A:	≥ 400 mm
Static load resistance according to EN 12730-A:	≥ 10 kg
Flexibility at low temperatures according to EN 1109:	≤ -10°C
Resistance to creep at high temperatures according to EN 1110:	≥ 100°C

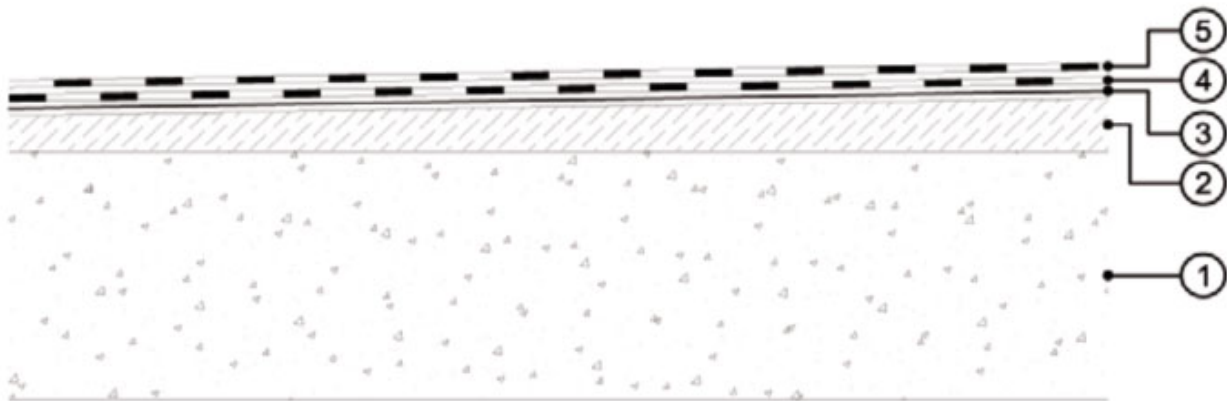
All other operations included and calculated in the price for work completed according to specification.

.....(€/m²)



Stratigraphic section of a flat roof

Exposed flat roof



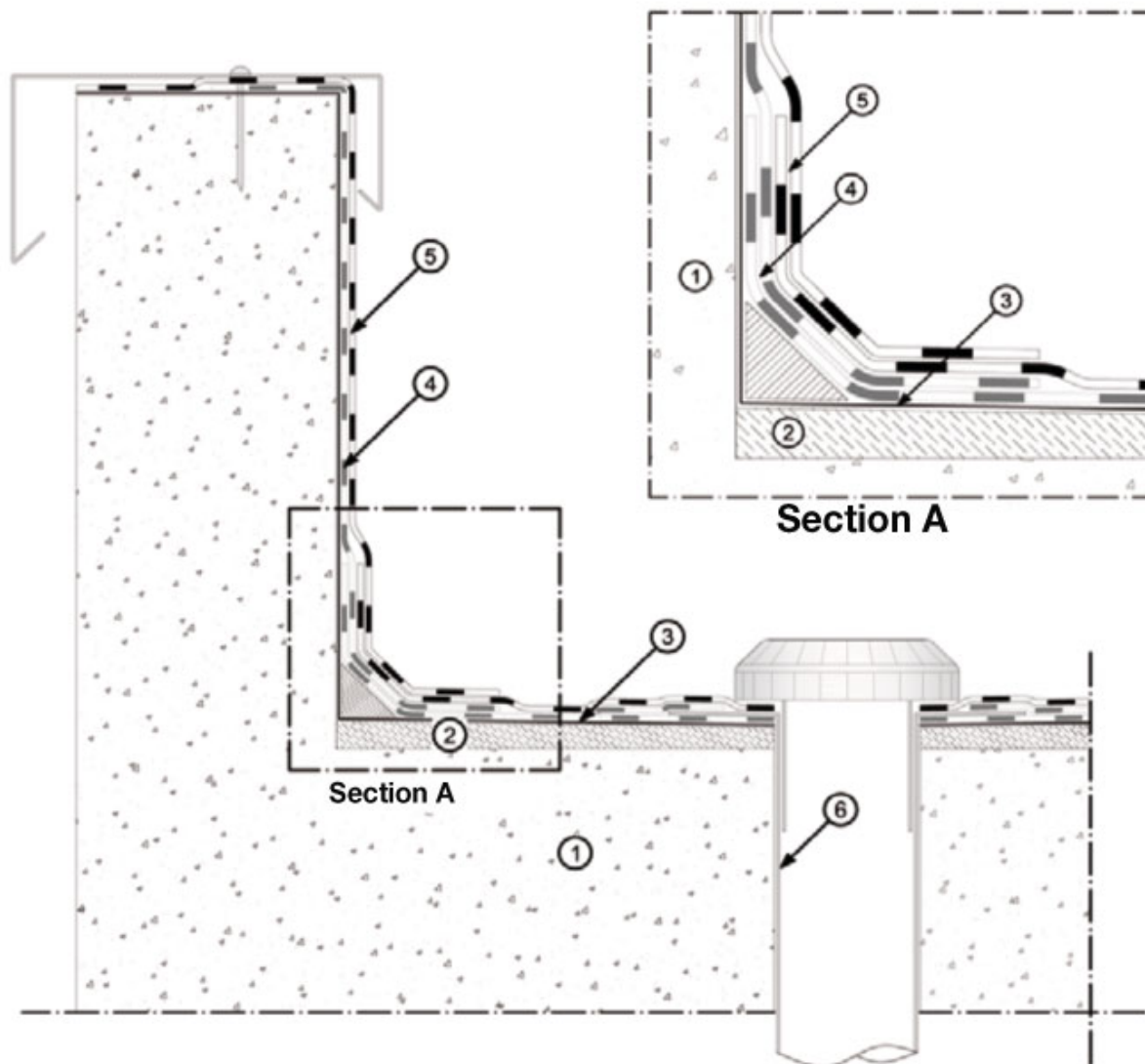
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Slate-filled bituminous membrane (second layer)

18.04.2011

Stratigraphic section O.2.1.1

Detailed sectional view of a flat roof

Exposed flat roof



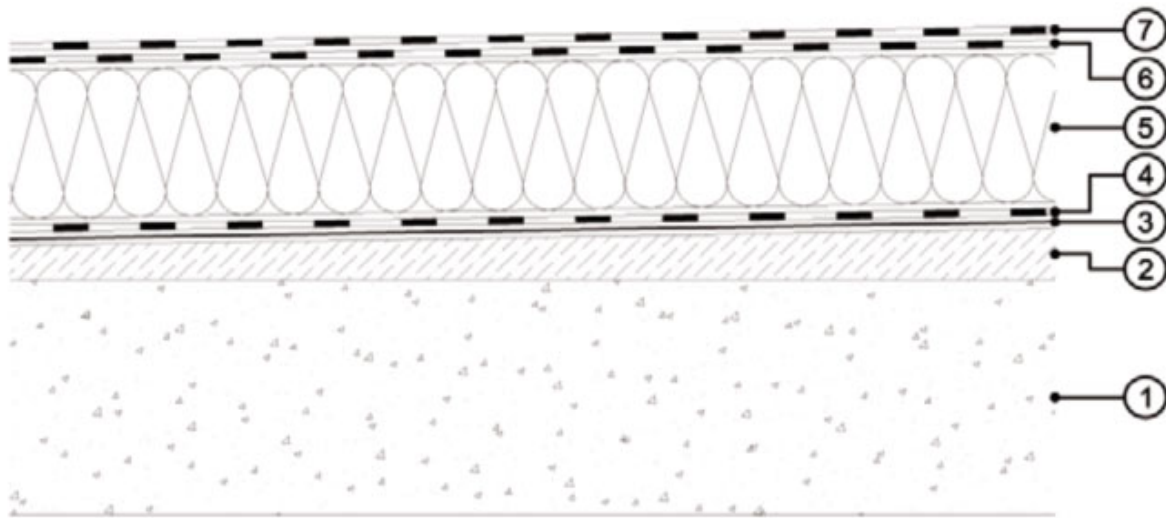
- ① Substrate
- ② Concrete sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Slate-filled bituminous membrane (second layer)
- ⑥ Vent pipe (20/10 lead)

18.04.2011

Detailed sectional view O.2.1.1

Stratigraphic section of a flat roof

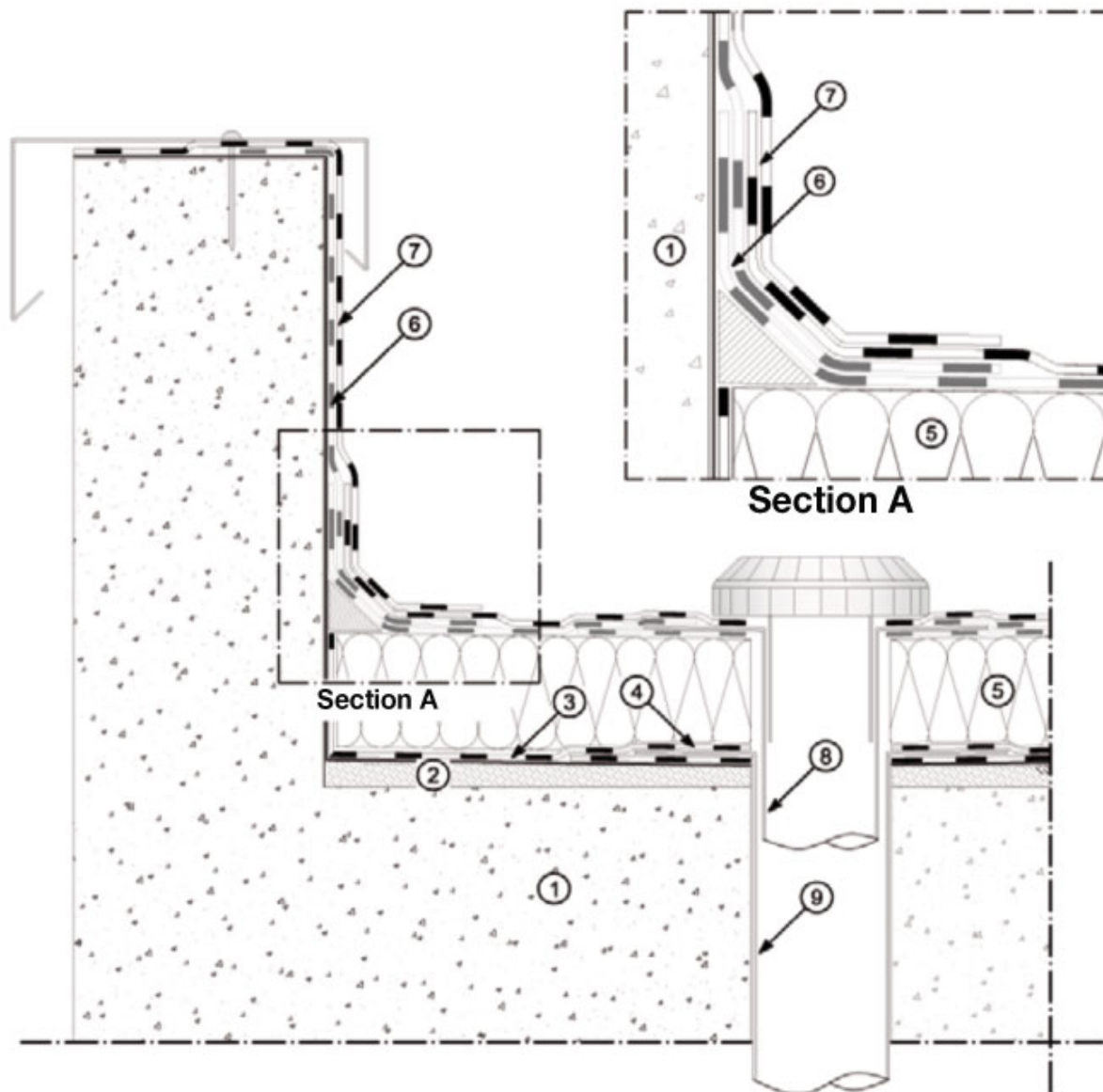
Exposed flat roof



- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ Bituminous membrane (first layer)
- ⑦ Slate-filled bituminous membrane (second layer)

Detailed sectional view of a flat roof

Exposed flat roof

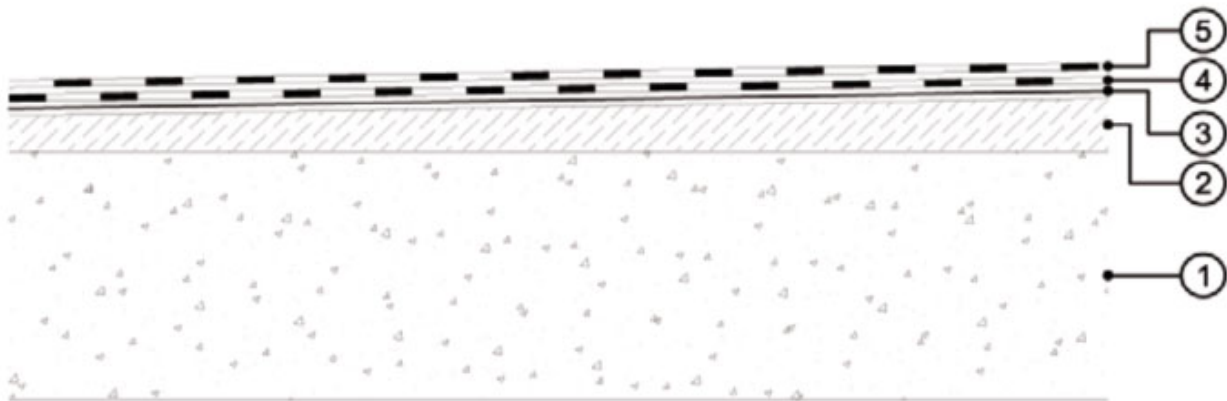


- | | |
|---------------------------|---|
| ① Substrate | ⑥ Bituminous membrane (first layer) |
| ② Concrete sloping screed | ⑦ Slate-filled bituminous membrane (second layer) |
| ③ Bituminous primer | ⑧ Vent pipe for the waterproofing membrane (20/10 lead) |
| ④ Vapour barrier | ⑨ Vent pipe for the vapour barrier (8/10 stainless steel) |
| ⑤ Insulating panel | |

18.04.2011

Detailed sectional view O.2.2.1

Stratigraphic section of a flat roof
Exposed flat roof
ADESO self-adhesive membrane



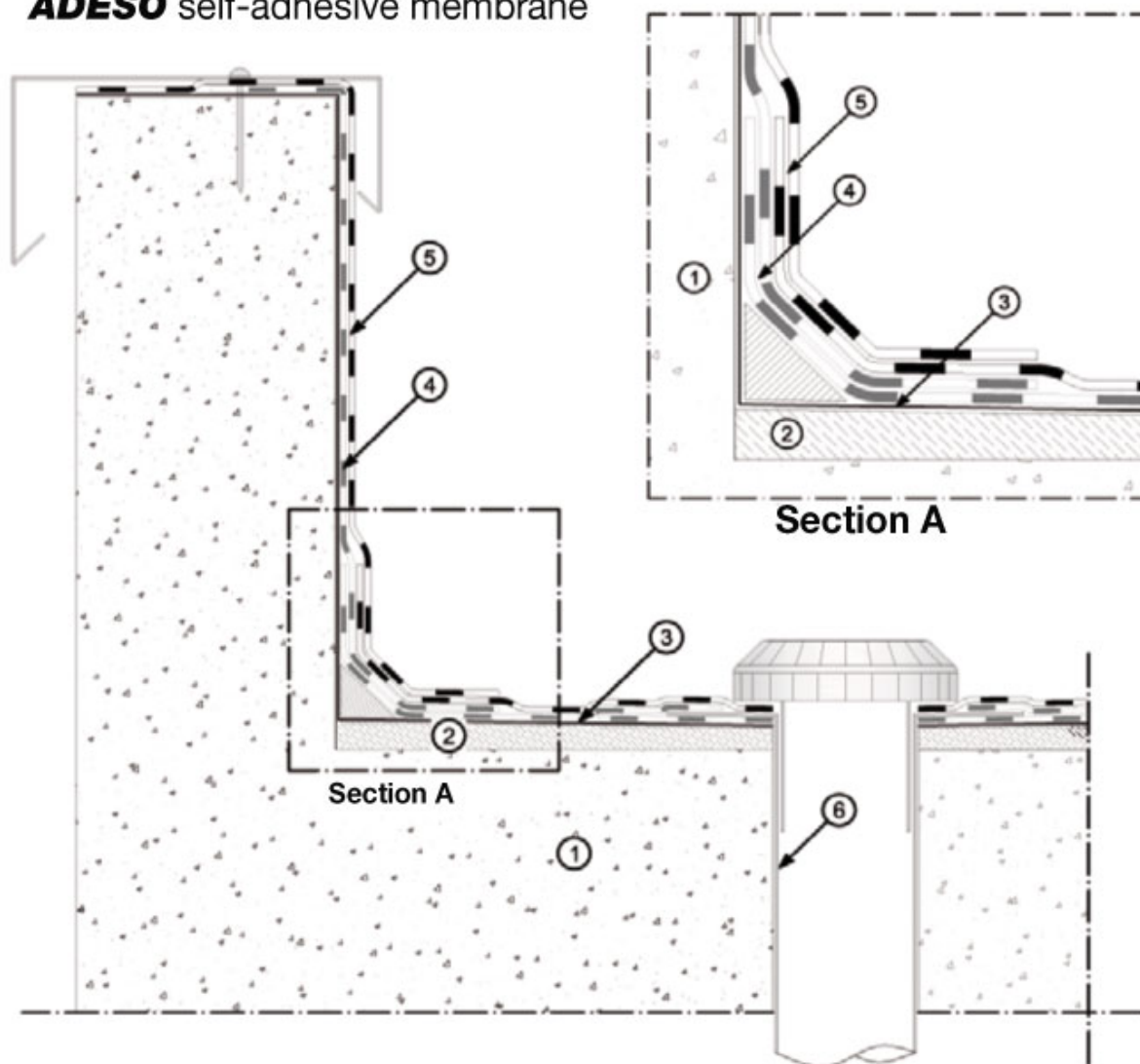
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ **ADESO** bituminous membrane (first layer)
- ⑤ **ADESO** slate-filled bituminous membrane (second layer)

** The second layer of waterproofing membrane must have a slate-filled top surface or be coated with specific heat-reflecting paint, such as POLYVER ALU*

Detailed sectional view of a flat roof

Exposed flat roof

ADESO self-adhesive membrane

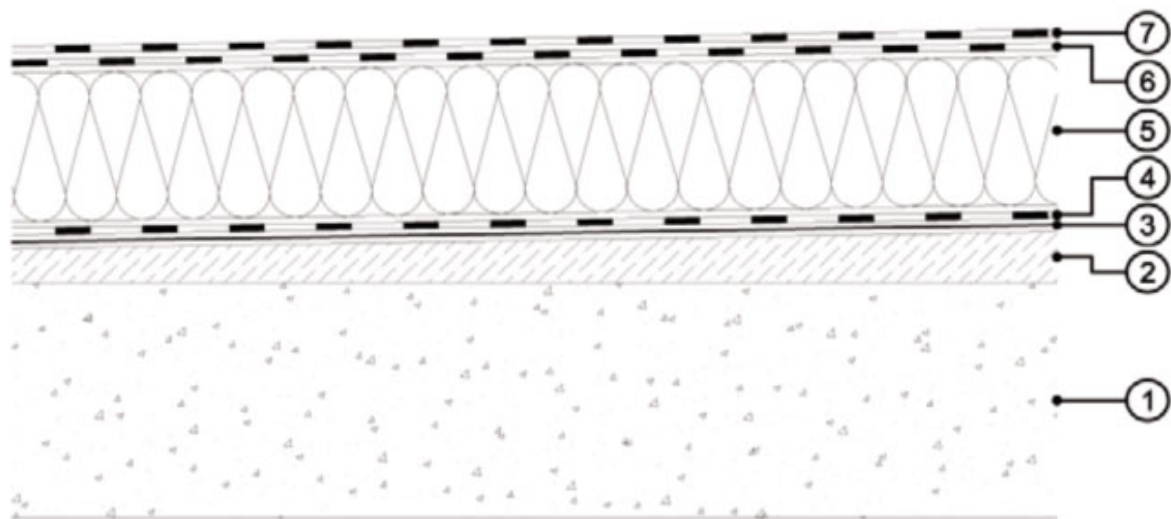


- ① Substrate
- ② Concrete sloping screed
- ③ Bituminous primer
- ④ **ADESO** bituminous membrane (first layer)
- ⑤ **ADESO** slate-filled bituminous membrane (second layer)
- ⑥ Vent pipe (20/10 lead)

Stratigraphic section of a flat roof

Exposed flat roof

ADESO self-adhesive membrane



- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ **ADESO** bituminous membrane (first layer)
- ⑦ **ADESO** slate-filled bituminous membrane (second layer)

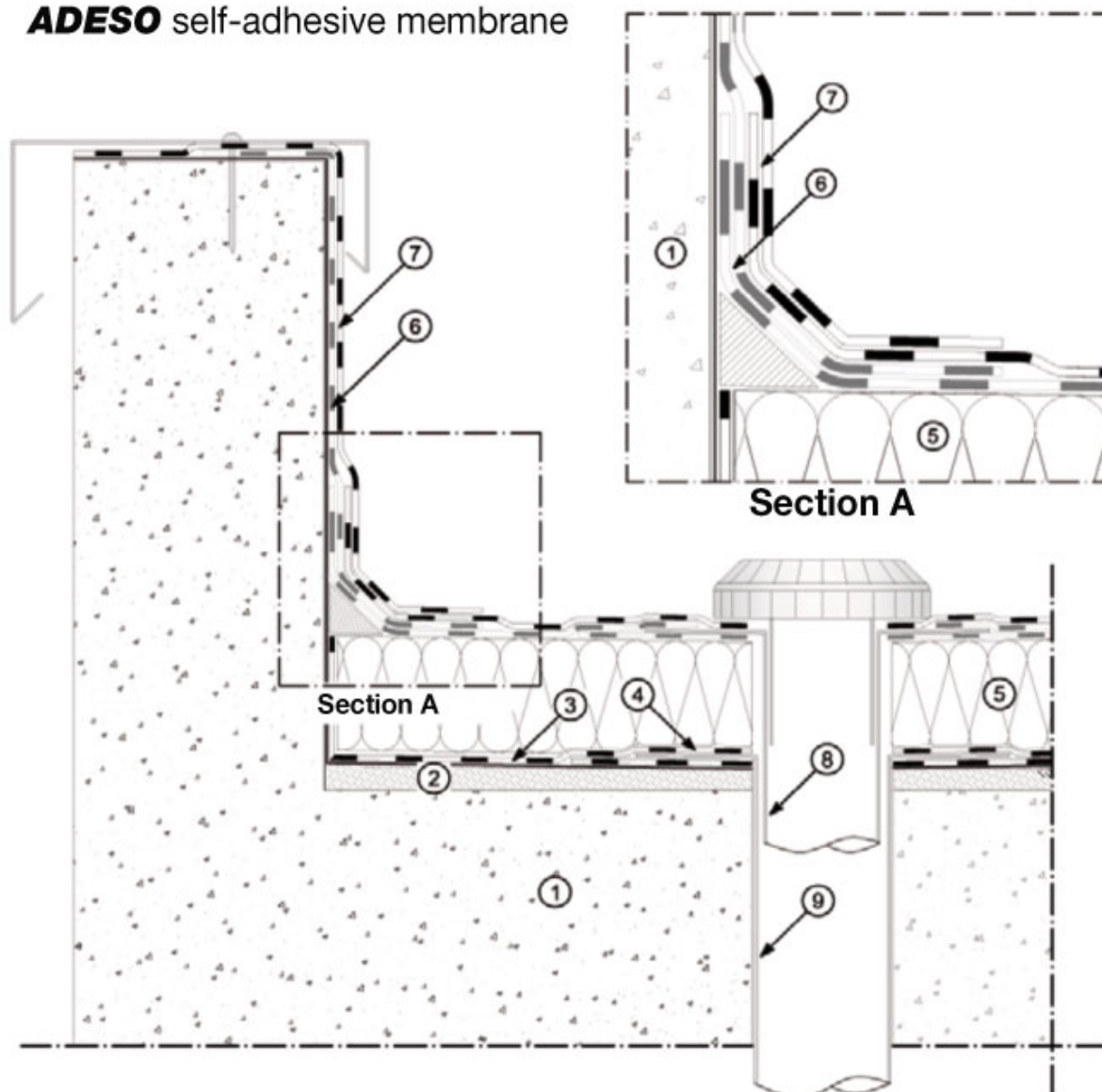
18.04.2011

Stratigraphic section O.3.2.1

Detailed sectional view of a flat roof

Exposed flat roof

ADESO self-adhesive membrane



- ① Substrate
- ② Concrete sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ **ADESO** bituminous membrane (first layer)

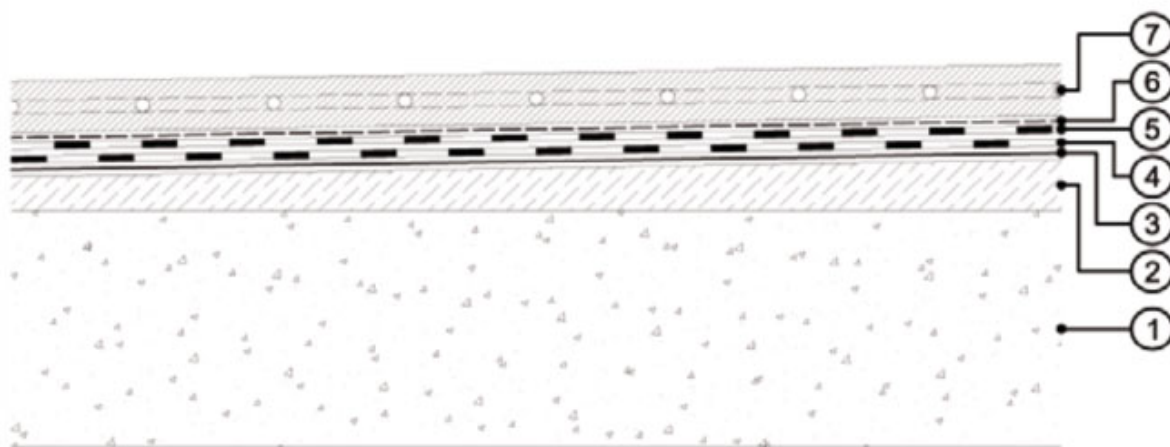
- ⑦ **ADESO** slate-filled bituminous membrane (second layer)
- ⑧ Vent pipe for the waterproofing membrane (20/10 lead)
- ⑨ Vent pipe for the vapour barrier (8/10 stainless steel)

18.04.2011

Detailed sectional view O.3.2.1

Stratigraphic section of a flat roof

Flat roof with industrial flooring



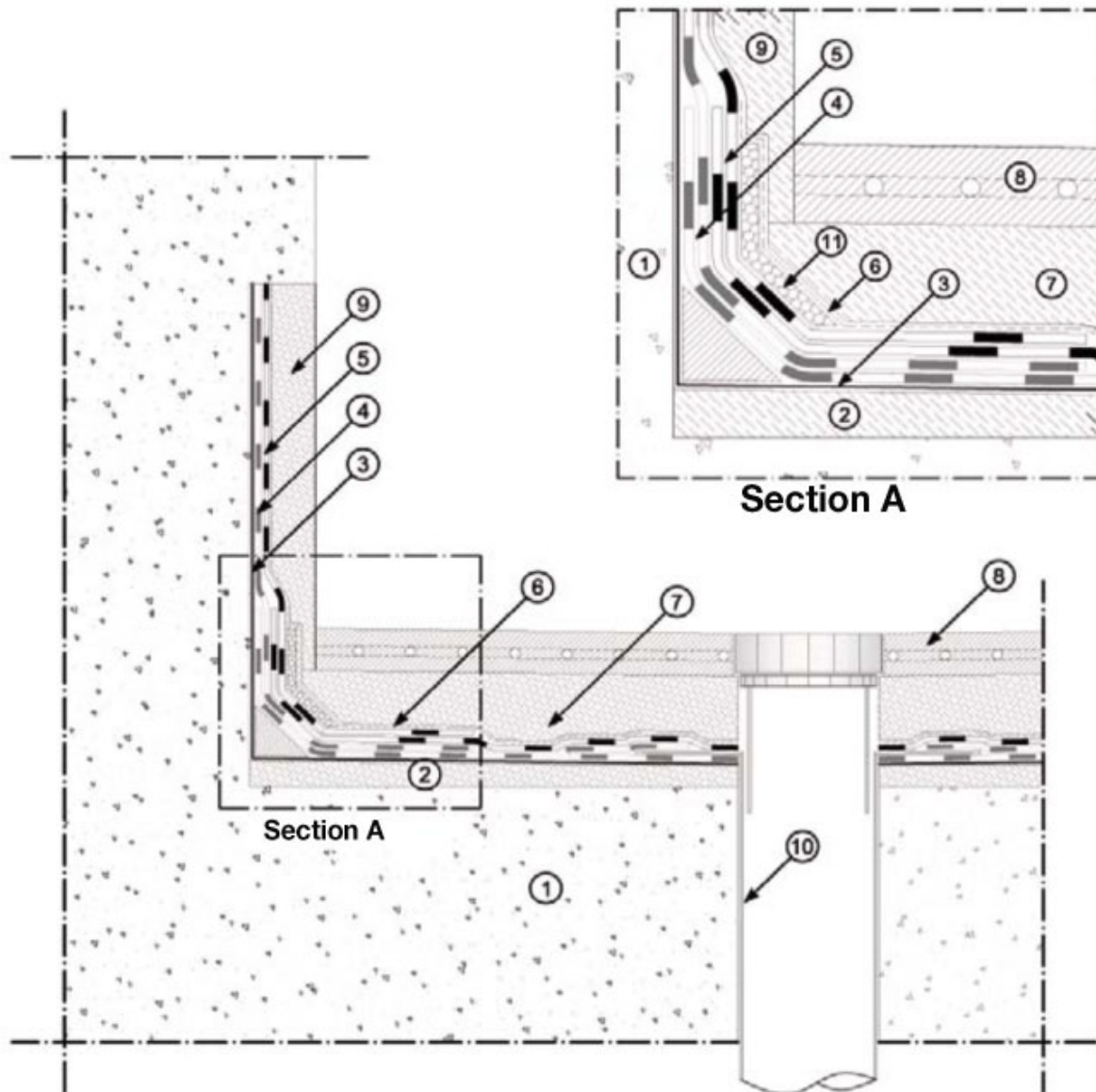
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Bituminous membrane (second layer)
- ⑥ Double separation layer
- ⑦ Industrial flooring

18.04.2011

Stratigraphic section O.4.1.1

Detailed sectional view of a flat roof

Flat roof with industrial flooring



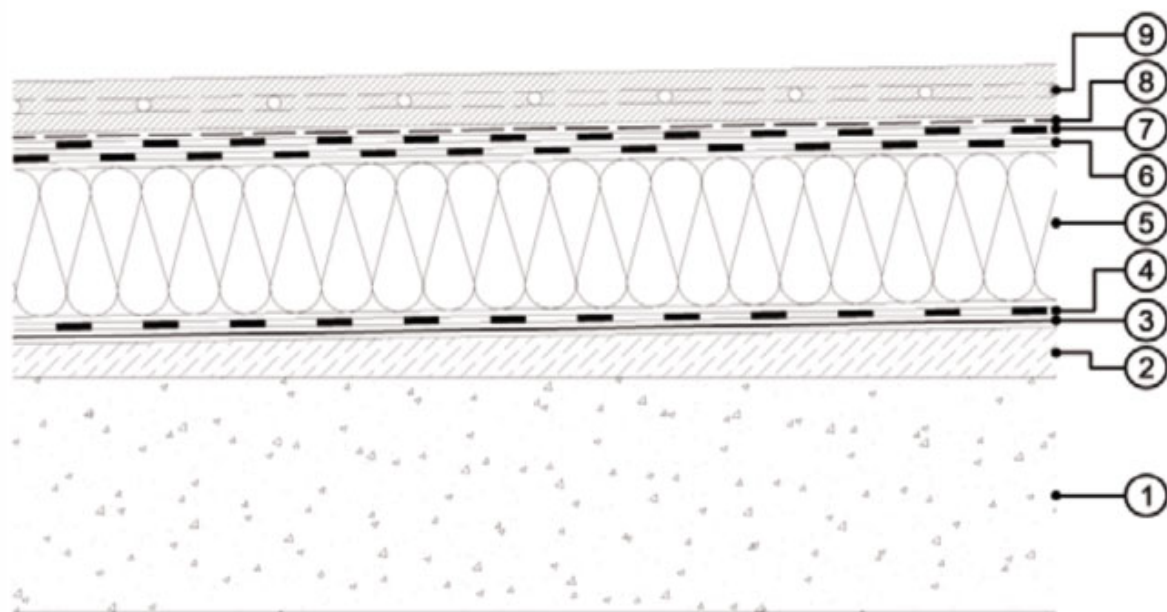
- | | |
|--------------------------------------|---|
| ① Substrate | ⑦ Protective screed |
| ② Concrete sloping screed | ⑧ Industrial flooring |
| ③ Bituminous primer | ⑨ Vertical hem protected with mesh and render |
| ④ Bituminous membrane (first layer) | ⑩ Vent pipe (20/10 lead) |
| ⑤ Bituminous membrane (second layer) | ⑪ Shock absorbing material |
| ⑥ Double separation layer | |

18.04.2011

Detailed sectional view O.4.1.1

Stratigraphic section of a flat roof

Flat roof with industrial flooring



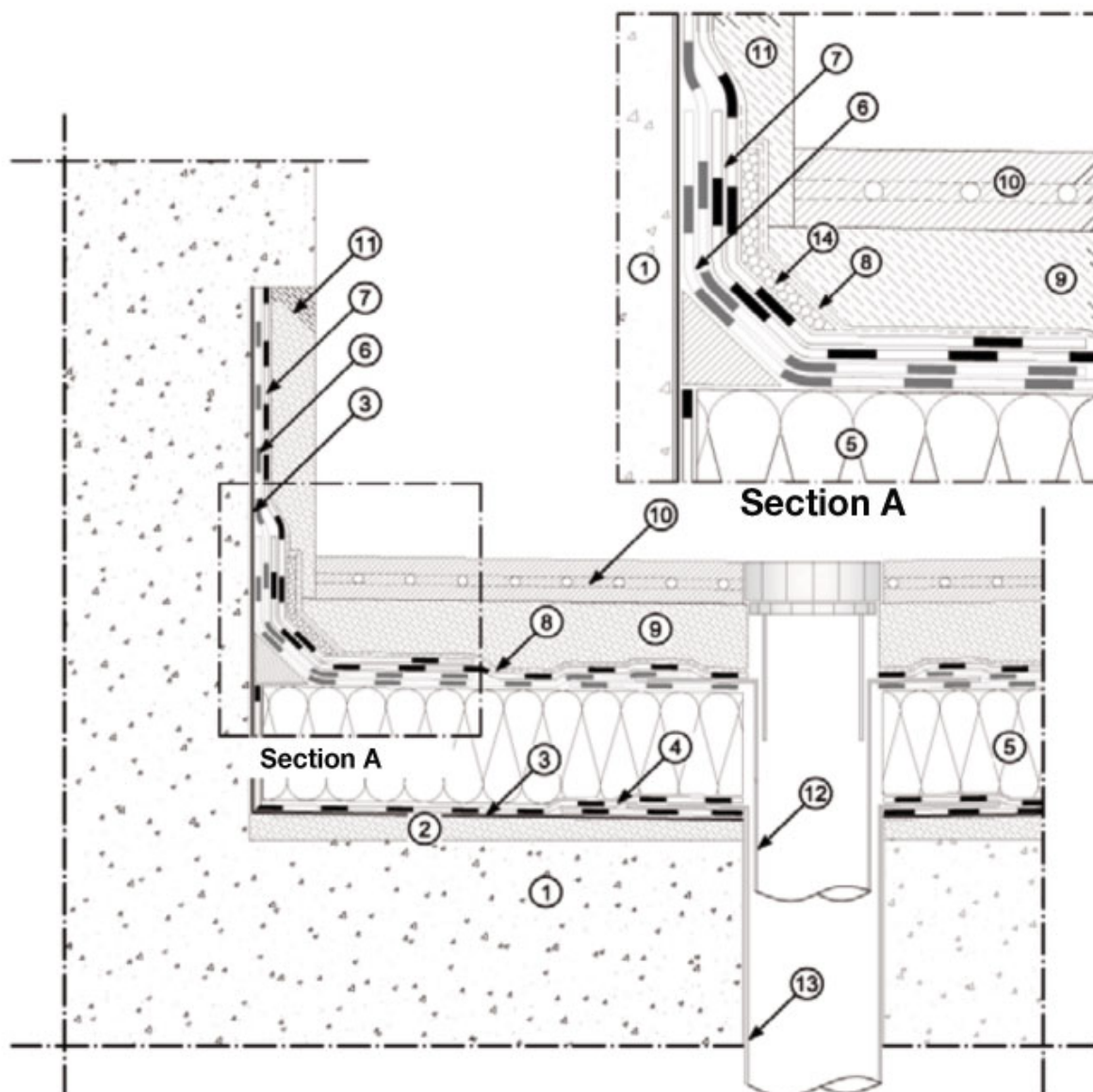
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ Bituminous membrane (first layer)
- ⑦ Bituminous membrane (second layer)
- ⑧ Double separation layer
- ⑨ Industrial flooring

18.04.2011

Stratigraphic section O.4.2.1

Detailed sectional view of a flat roof

Flat roof with industrial flooring



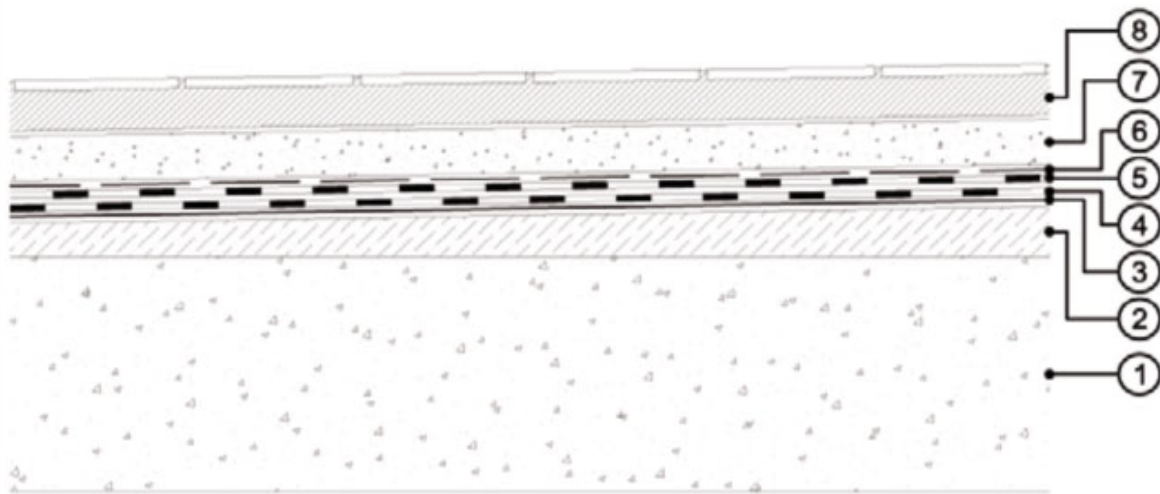
- | | |
|--------------------------------------|---|
| ① Substrate | ⑧ Double separation layer |
| ② Concrete sloping screed | ⑨ Protective screed |
| ③ Bituminous primer | ⑩ Industrial flooring |
| ④ Vapour barrier | ⑪ Vertical hem protected with mesh and render |
| ⑤ Insulating panel | ⑫ Vent pipe (20/10 lead) |
| ⑥ Bituminous membrane (first layer) | ⑬ Vent pipe (8/10 stainless steel) |
| ⑦ Bituminous membrane (second layer) | ⑭ Shock absorbing material |

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Detailed sectional view O.4.2.1

Stratigraphic section of a flat roof

Flat roof with tiled flooring



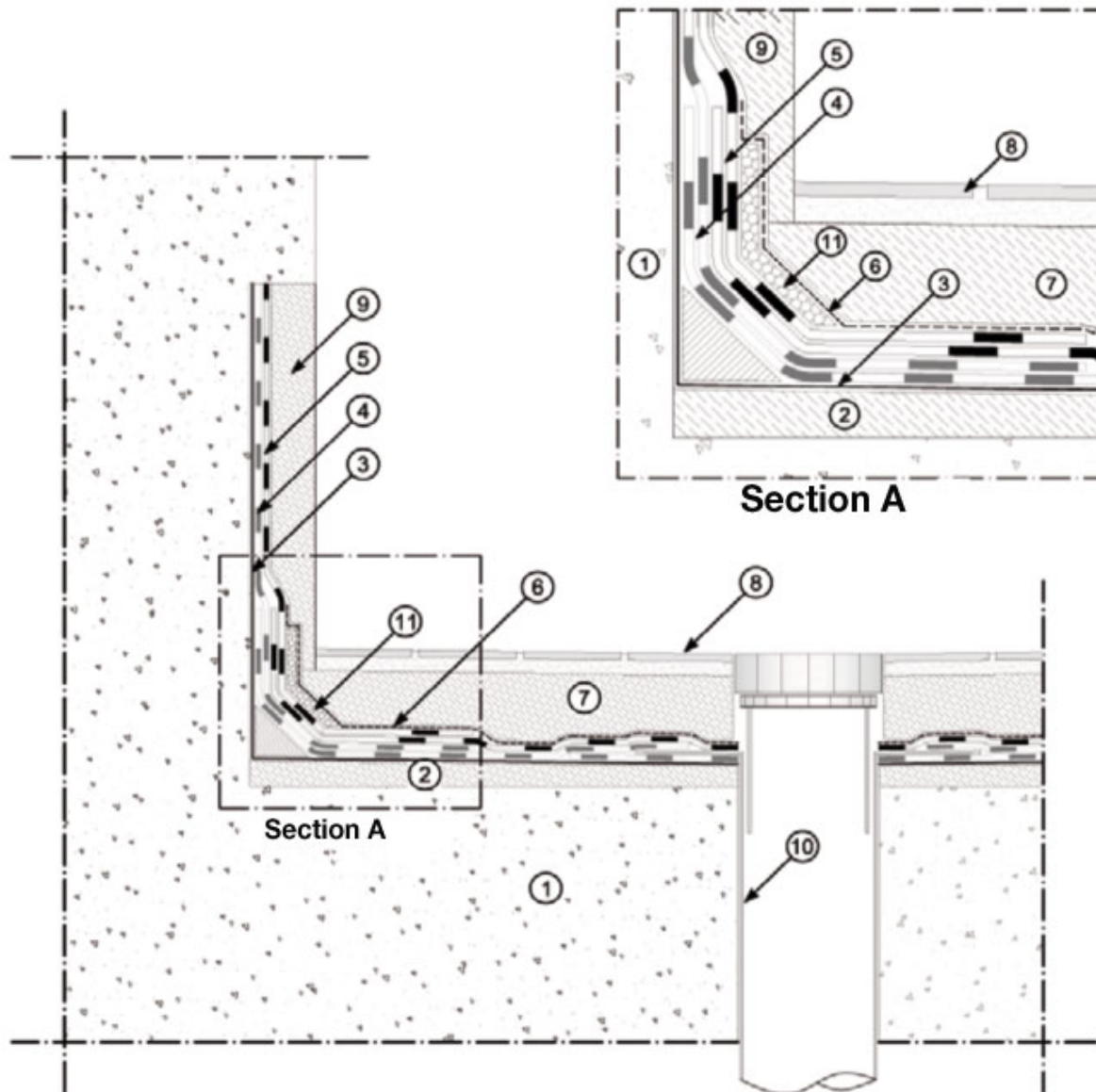
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Bituminous membrane (second layer)
- ⑥ Double separation layer
- ⑦ Protective concrete screed
- ⑧ Tiled flooring

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Stratigraphic section O.5.1.1

Detailed sectional view of a flat roof

Flat roof with tiled flooring



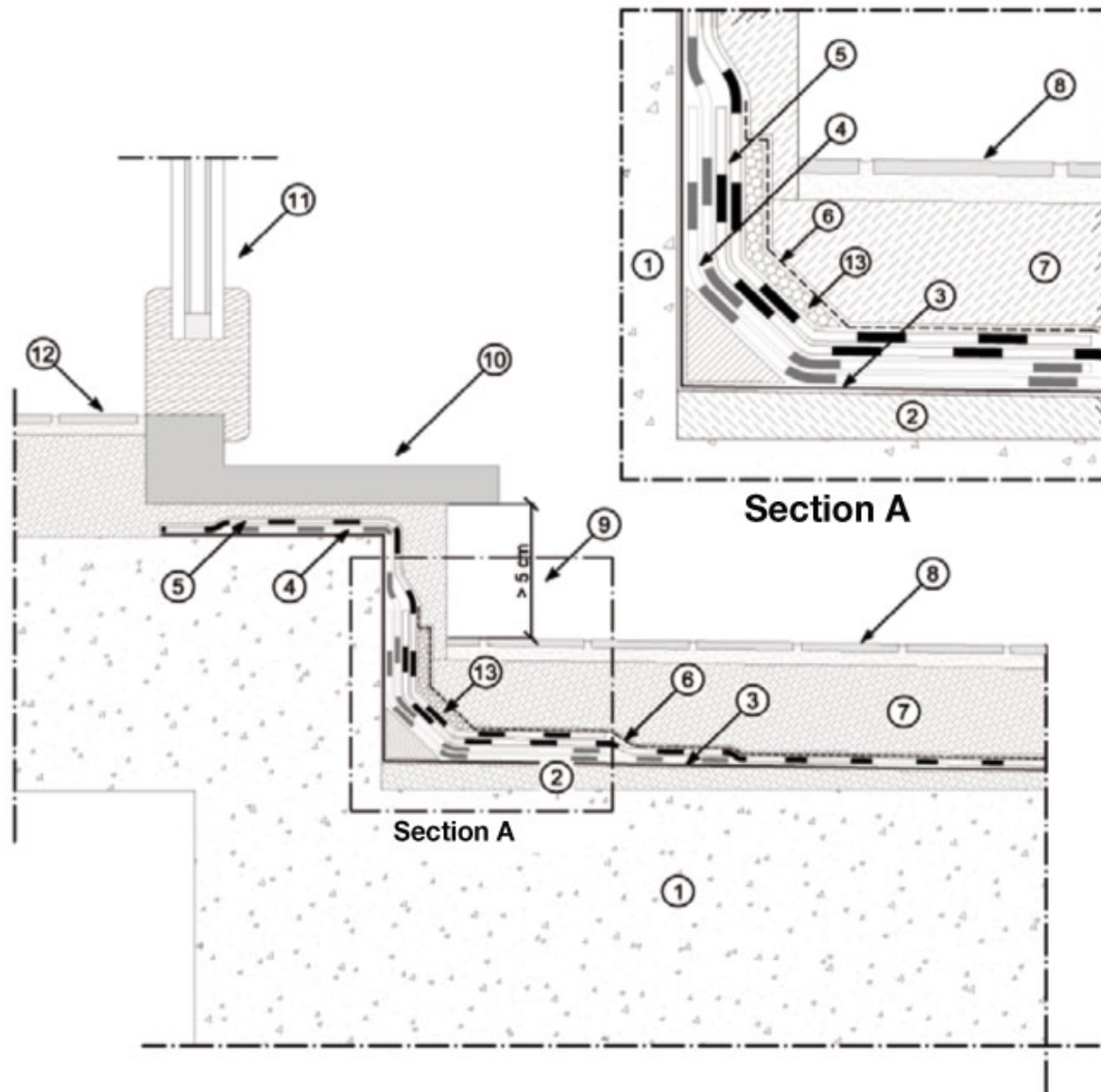
- | | |
|--------------------------------------|---|
| ① Substrate | ⑦ Protective screed |
| ② Concrete sloping screed | ⑧ Tiled flooring |
| ③ Bituminous primer | ⑨ Vertical hem protected with mesh and render |
| ④ Bituminous membrane (first layer) | ⑩ Vent pipe (20/10 lead) |
| ⑤ Bituminous membrane (second layer) | ⑪ Shock absorbing material |
| ⑥ Double separation layer | |

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Detailed sectional view O.5.1.1

Detailed sectional view of a flat roof

Flat roof with tiled flooring



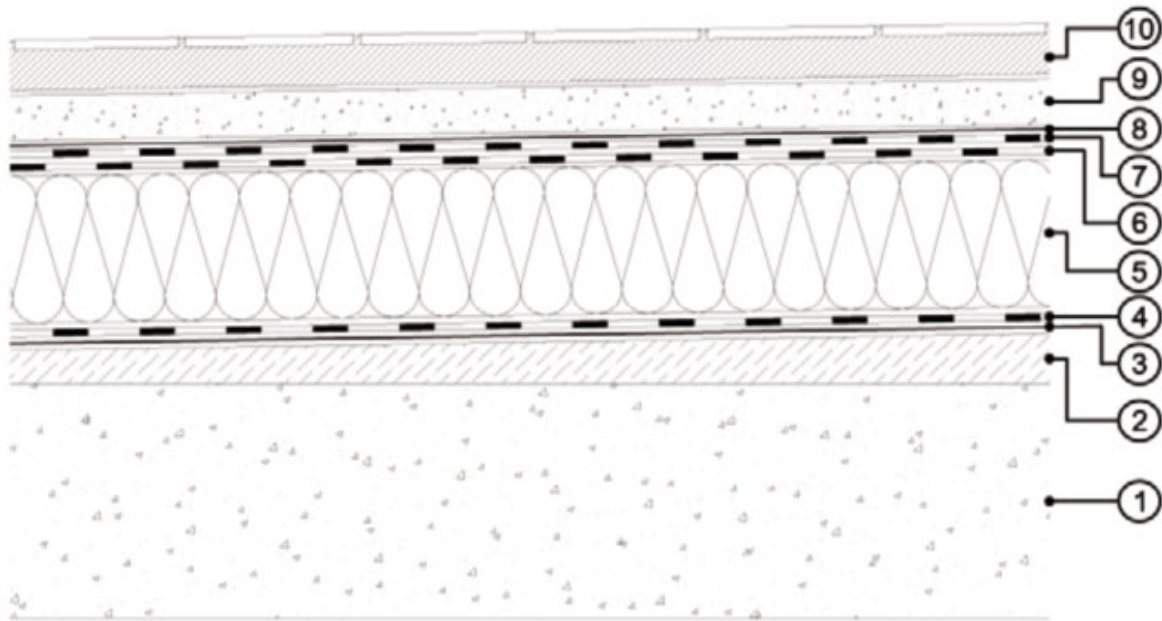
- | | |
|--------------------------------------|--------------------------------------|
| ① Substrate | ⑧ Tiled flooring |
| ② Concrete sloping screed | ⑨ Minimum water containment distance |
| ③ Bituminous primer | ⑩ Threshold |
| ④ Bituminous membrane (first layer) | ⑪ Balcony contact point |
| ⑤ Bituminous membrane (second layer) | ⑫ Internal tiled flooring |
| ⑥ Double separation layer | ⑬ Shock absorbing material |
| ⑦ Protective concrete layer | |

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Detailed sectional view O.5.1.2

Stratigraphic section of a flat roof

Flat roof with tiled flooring

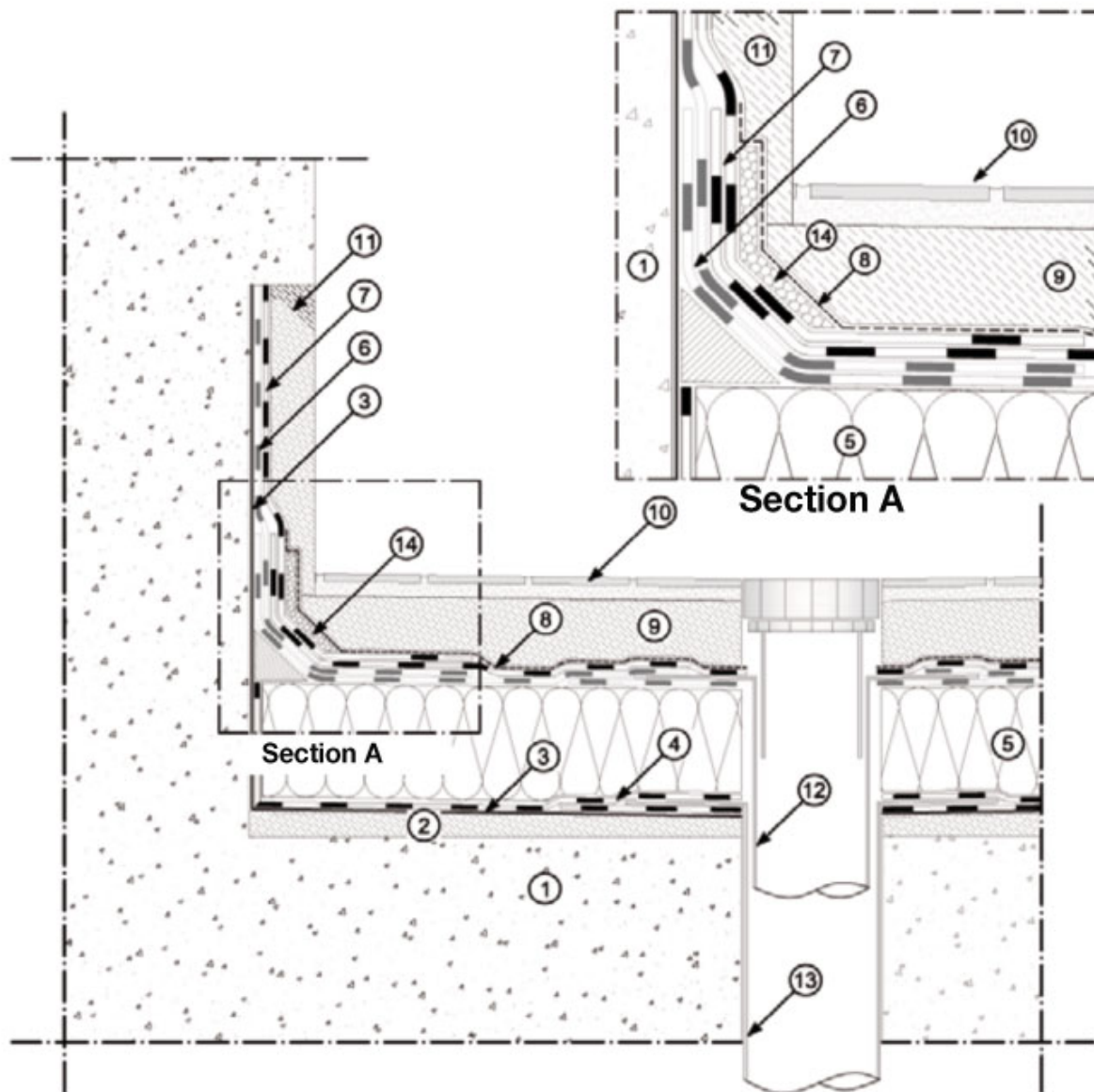


- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ Bituminous membrane (first layer)
- ⑦ Bituminous membrane (second layer)
- ⑧ Double separation layer
- ⑨ Protective concrete screed
- ⑩ Tiled flooring

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Stratigraphic section O.5.1.2

Detailed sectional view of a flat roof Flat roof with tiled flooring



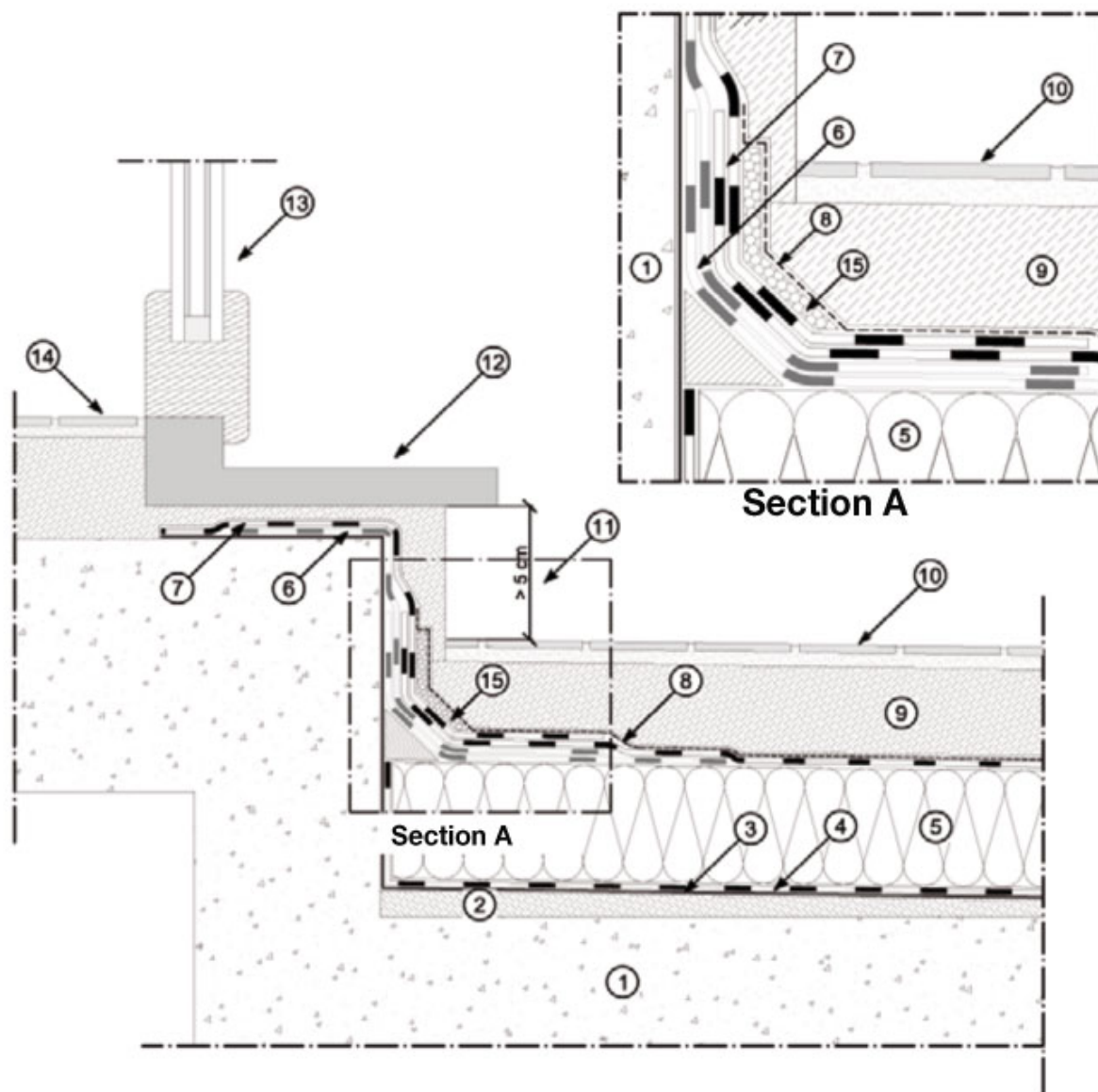
- | | |
|--------------------------------------|---|
| ① Substrate | ⑧ Double separation layer |
| ② Concrete sloping screed | ⑨ Protective screed |
| ③ Bituminous primer | ⑩ Tiled flooring |
| ④ Vapour barrier | ⑪ Vertical hem protected with mesh and render |
| ⑤ Insulating panel | ⑫ Vent pipe (20/10 lead) |
| ⑥ Bituminous membrane (first layer) | ⑬ Vent pipe (8/10 stainless steel) |
| ⑦ Bituminous membrane (second layer) | ⑭ Shock absorbing material |

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Detailed sectional view O.5.2.1

Detailed sectional view of a flat roof

Flat roof with tiled flooring



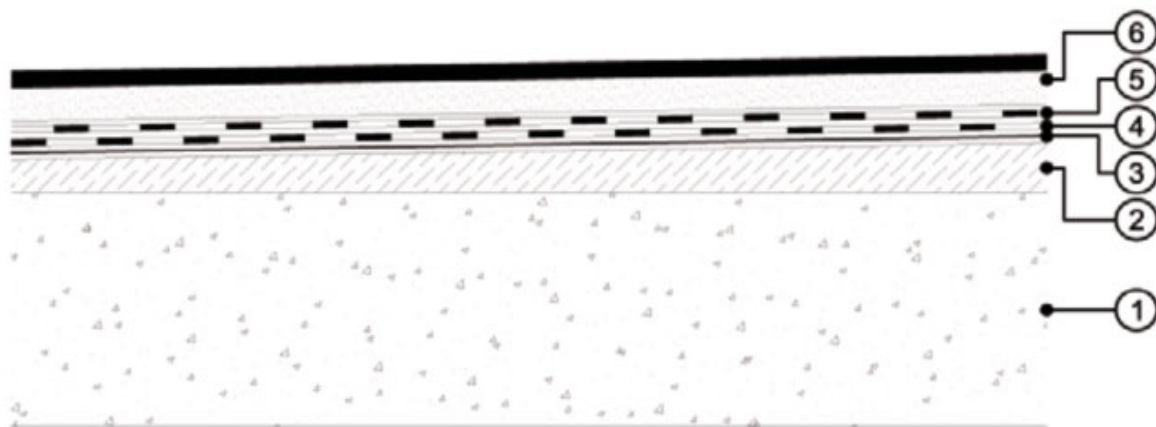
- | | |
|--------------------------------------|--------------------------------------|
| ① Substrate | ⑨ Protective concrete layer |
| ② Concrete sloping screed | ⑩ Tiled flooring |
| ③ Bituminous primer | ⑪ Minimum water containment distance |
| ④ Vapour barrier | ⑫ Threshold |
| ⑤ Insulating panel | ⑬ Balcony contact point |
| ⑥ Bituminous membrane (first layer) | ⑭ Internal tiled flooring |
| ⑦ Bituminous membrane (second layer) | ⑮ Shock absorbing material |
| ⑧ Double separation layer | |

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Detailed sectional view O.5.2.2

Stratigraphic section of a flat roof

Flat roof suitable for vehicles



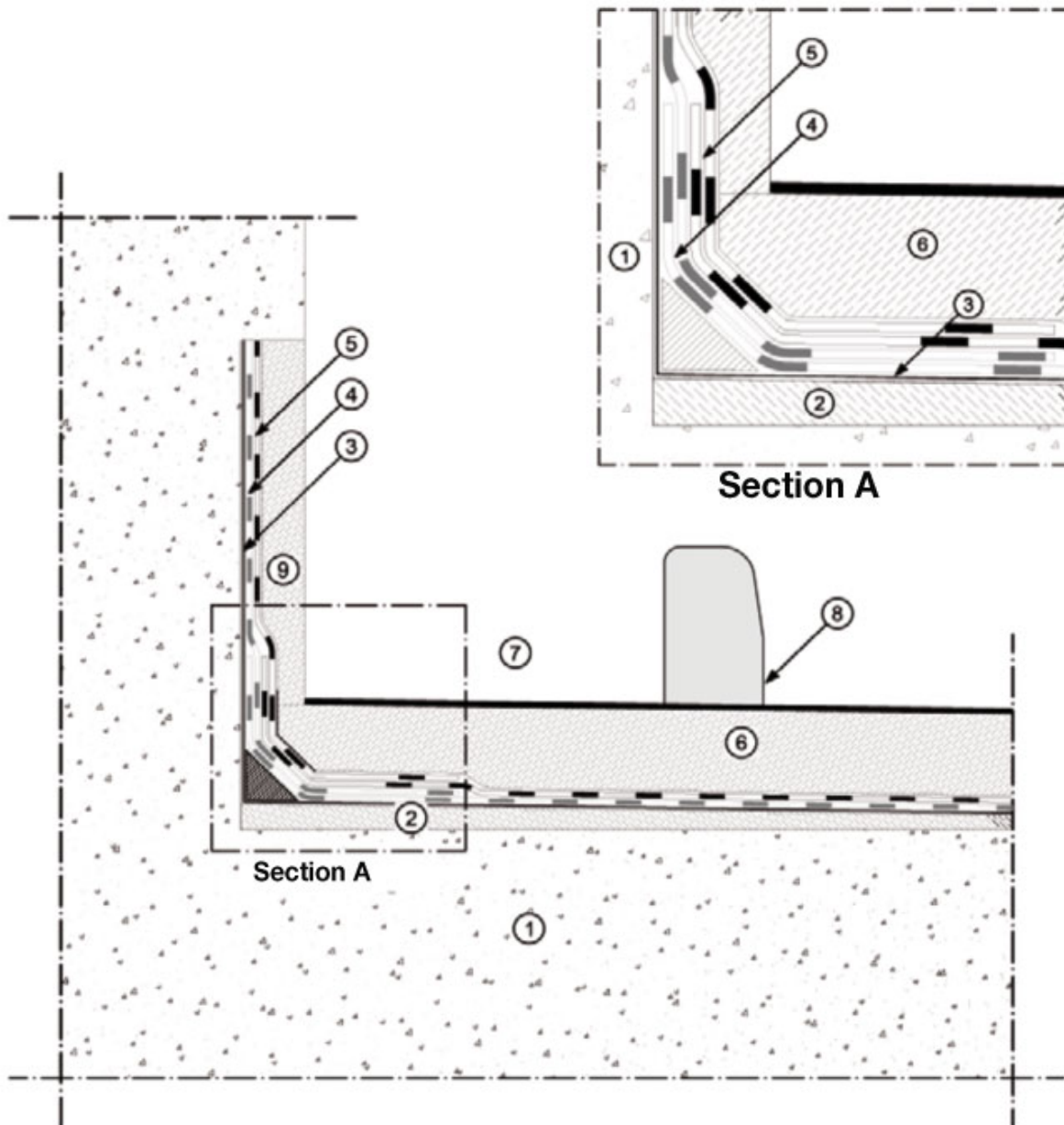
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Bituminous membrane (second layer)
- ⑥ Wear layer in paving-grade binder

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Stratigraphic section O.6.1.1

Detailed sectional view of a flat roof

Flat roof suitable for vehicles



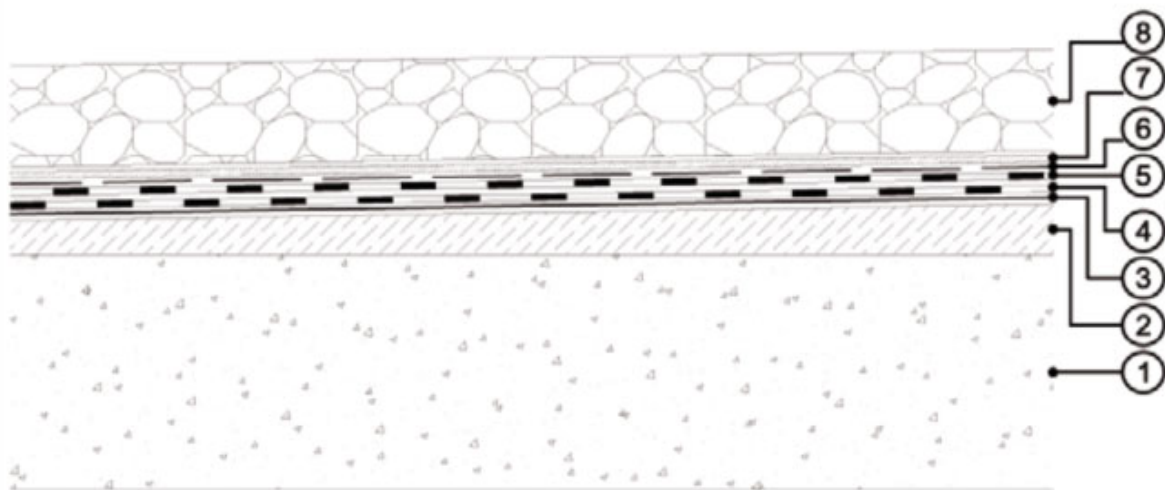
- | | |
|-------------------------------------|---|
| ① Substrate | ⑤ Bituminous membrane (second layer) |
| ② Concrete sloping screed | ⑥ Paving-grade binder |
| ③ Bituminous primer | ⑦ Pedestrian access |
| ④ Bituminous membrane (first layer) | ⑧ Protective kerb |
| | ⑨ Vertical hem protected with mesh and render |

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Detailed sectional view O.6.1.1

Stratigraphic section of a flat roof

Flat roof with a gravel protection layer



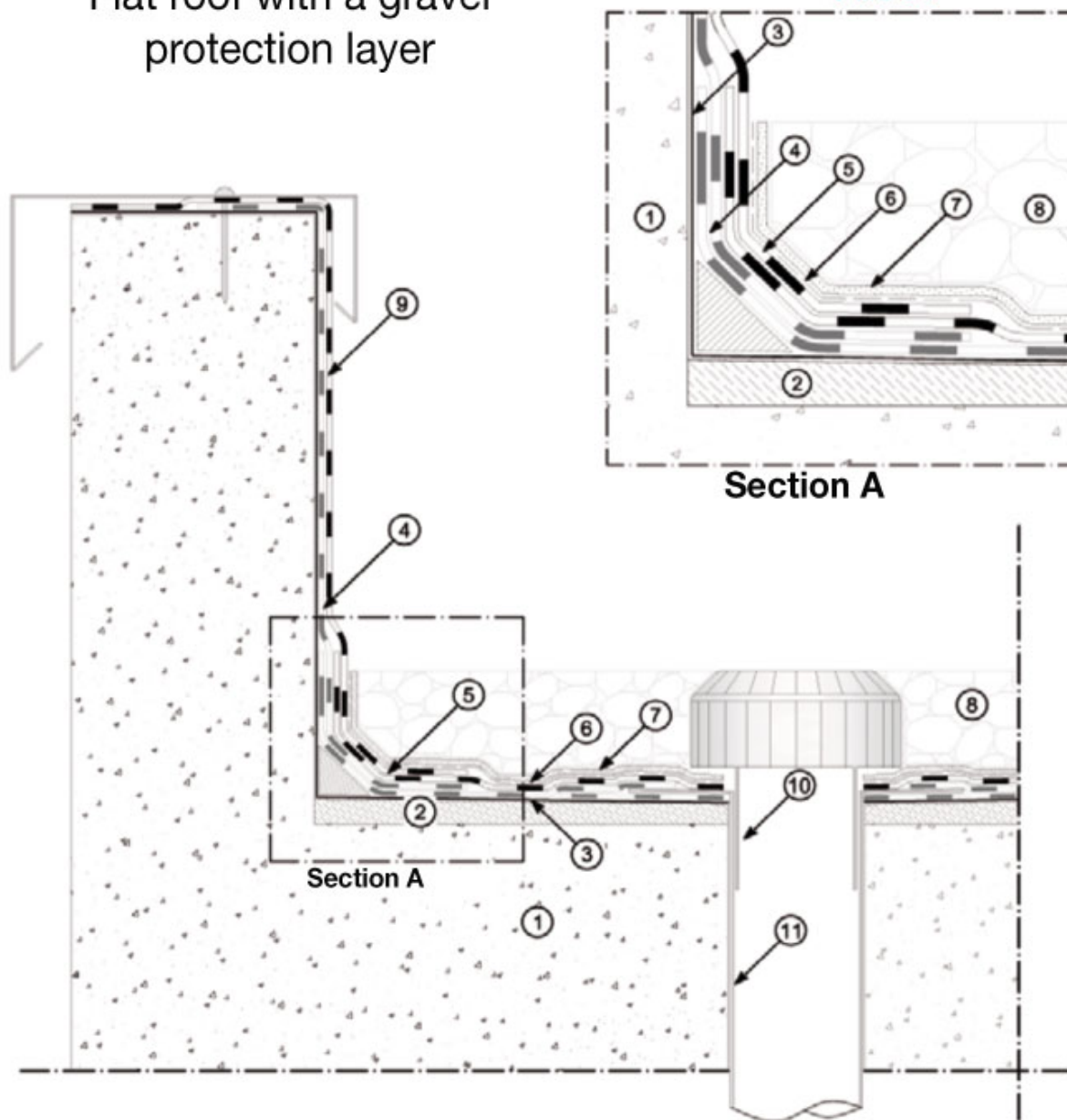
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Bituminous membrane (second layer)
- ⑥ Separation layer
- ⑦ Filtration layer
- ⑧ Gravel protection layer

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Stratigraphic section O.7.1.1

Detailed sectional view of a flat roof

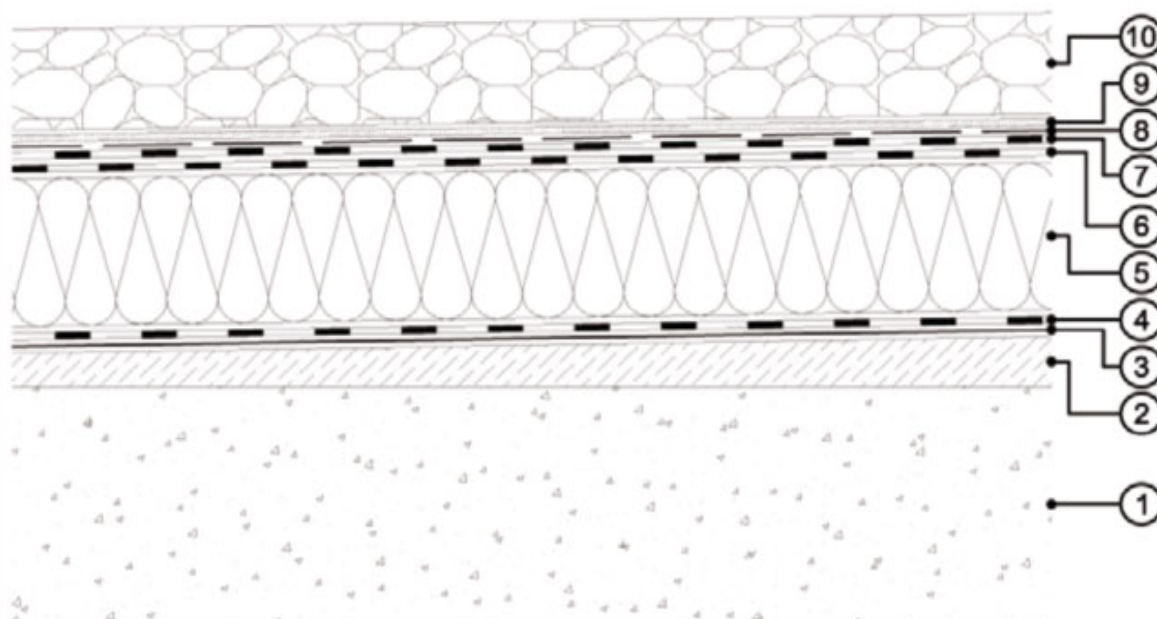
Flat roof with a gravel
protection layer



- | | |
|--------------------------------------|---|
| ① Substrate | ⑦ Non-woven fabric filtration layer |
| ② Concrete sloping screed | ⑧ Pebble protection layer |
| ③ Bituminous primer | ⑨ Vertical hem protected with mesh and render |
| ④ Bituminous membrane (first layer) | ⑩ Vent pipe (20/10 lead) |
| ⑤ Bituminous membrane (second layer) | ⑪ Vent pipe (8/10 stainless steel) |
| ⑥ Polyethylene separation layer | |

Stratigraphic section of a flat roof

Flat roof with a gravel protection layer



- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ Bituminous membrane (first layer)
- ⑦ Bituminous membrane (second layer)
- ⑧ Separation layer
- ⑨ Filtration layer
- ⑩ Gravel protection layer

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Stratigraphic section O.7.2.1

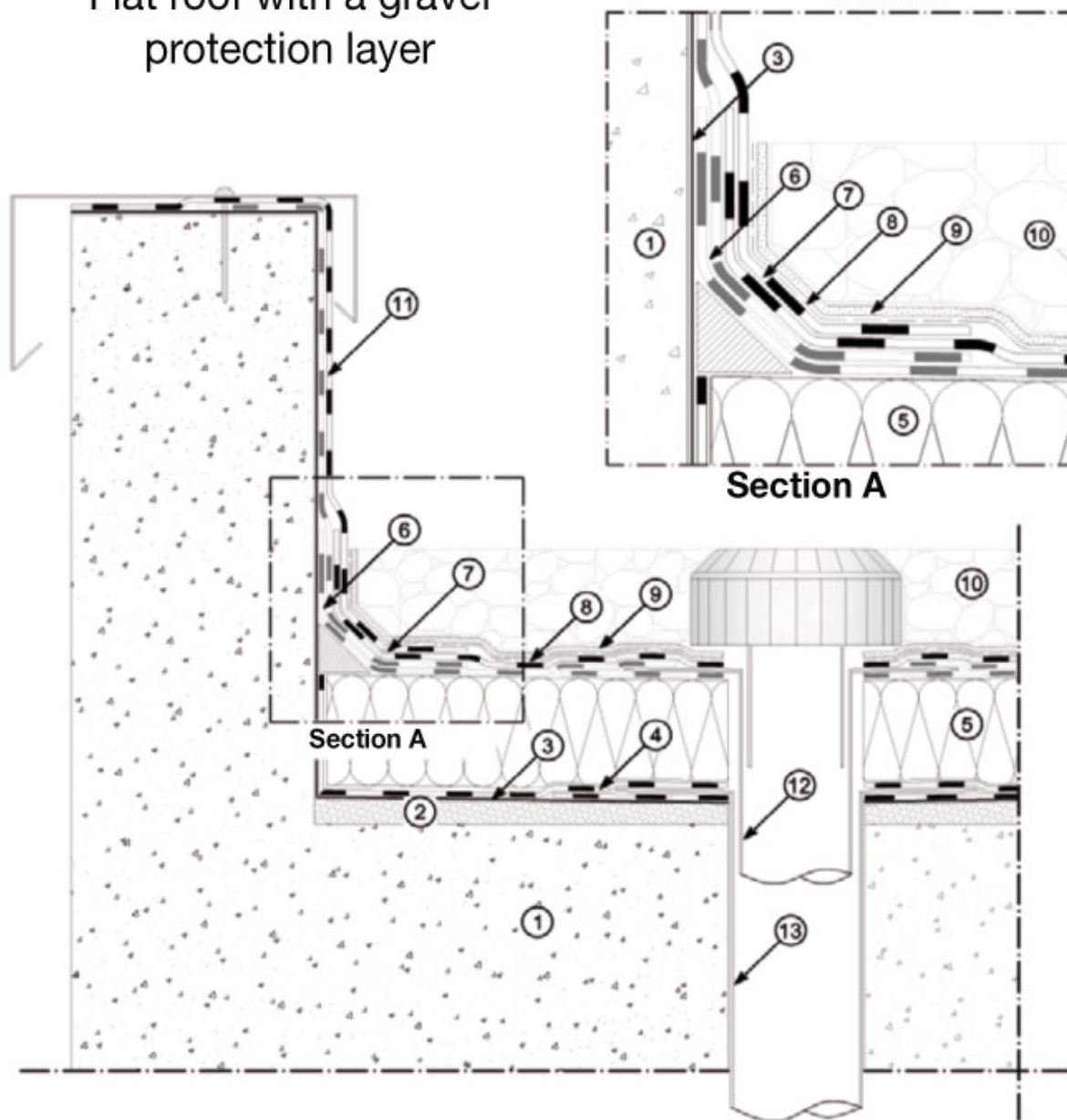
Detailed sectional view of a flat roof

Flat roof with a gravel
protection layer

WATERPROOFING MATERIALS AND INSULATING SYSTEMS

POLYGLASS 

 MAPEI
GROUP

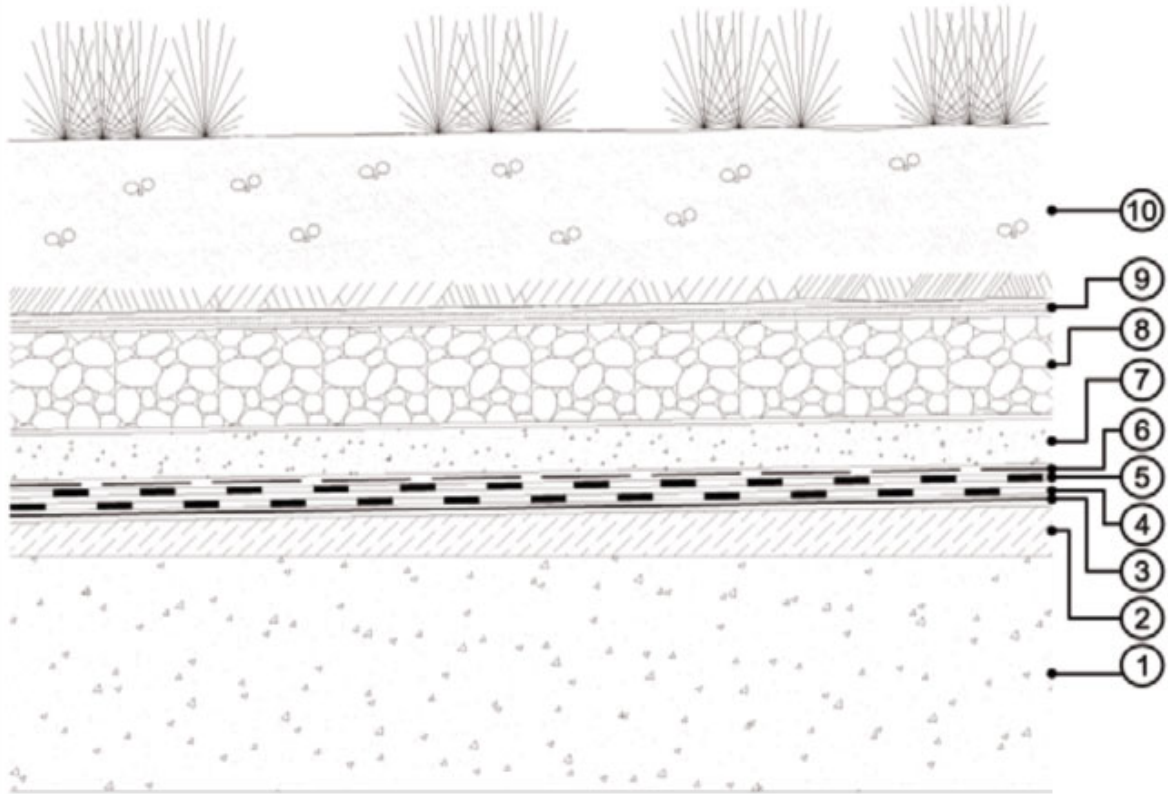


- | | |
|--------------------------------------|---|
| ① Substrate | ⑧ Polyethylene separation layer |
| ② Concrete sloping screed | ⑨ Non-woven fabric filtration layer |
| ③ Bituminous primer | ⑩ Pebble protection layer |
| ④ Vapour barrier | ⑪ Vertical hem in stone-filled membrane |
| ⑤ Insulating panel | ⑫ Vent pipe (20/10 lead) |
| ⑥ Bituminous membrane (first layer) | ⑬ Vent pipe (8/10 stainless steel) |
| ⑦ Bituminous membrane (second layer) | |

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Detailed sectional view O.7.2.1

Stratigraphic section of a flat roof Roof garden



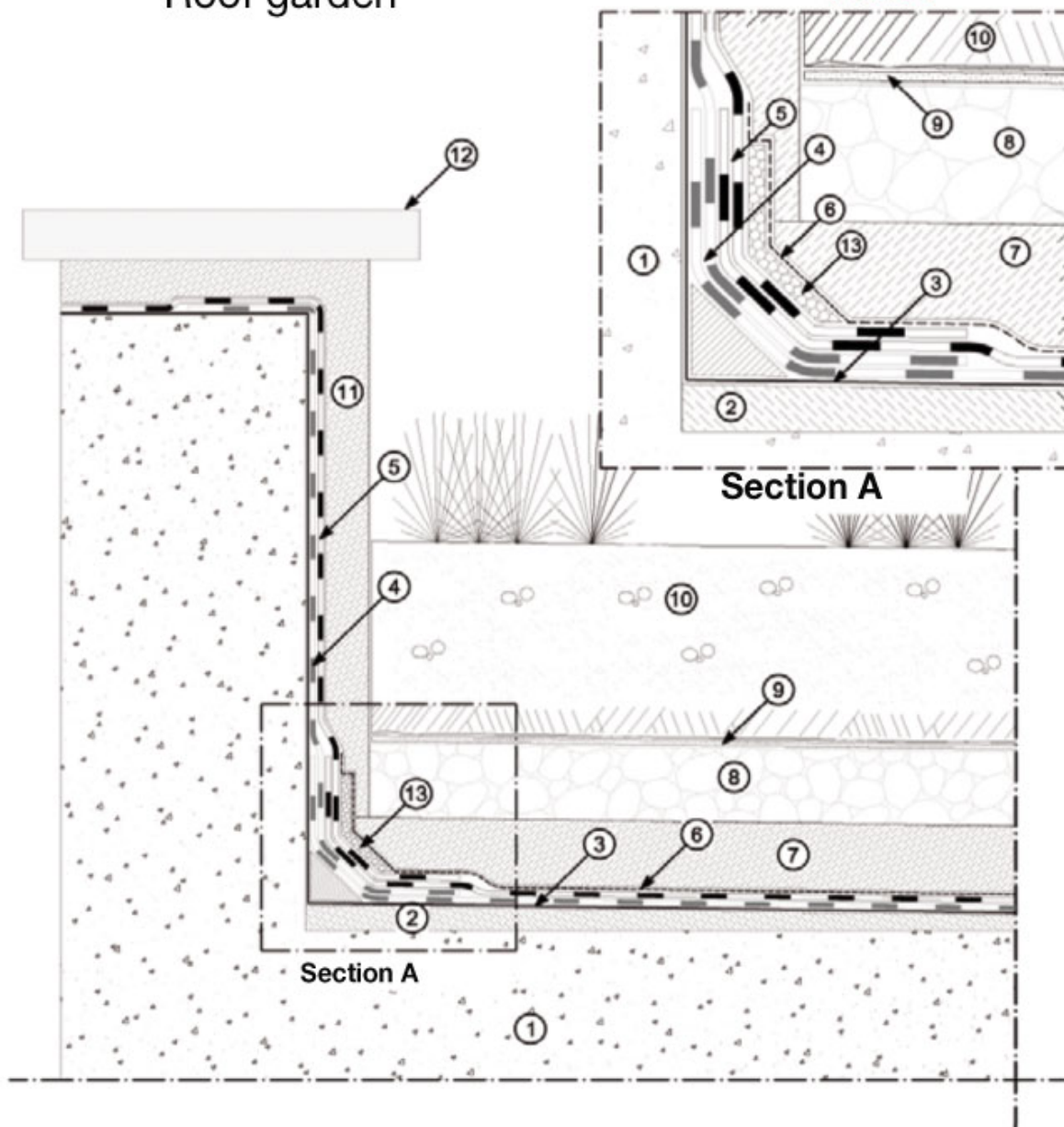
- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Bituminous membrane (first layer)
- ⑤ Bituminous membrane (second layer)
- ⑥ Double separation layer
- ⑦ Protective concrete screed
- ⑧ Gravel drainage layer
- ⑨ Filtration layer
- ⑩ Soil

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Stratigraphic section O.8.1.1

Detailed sectional view of a flat roof Roof garden

WATERPROOFING MATERIALS AND INSULATING SYSTEMS

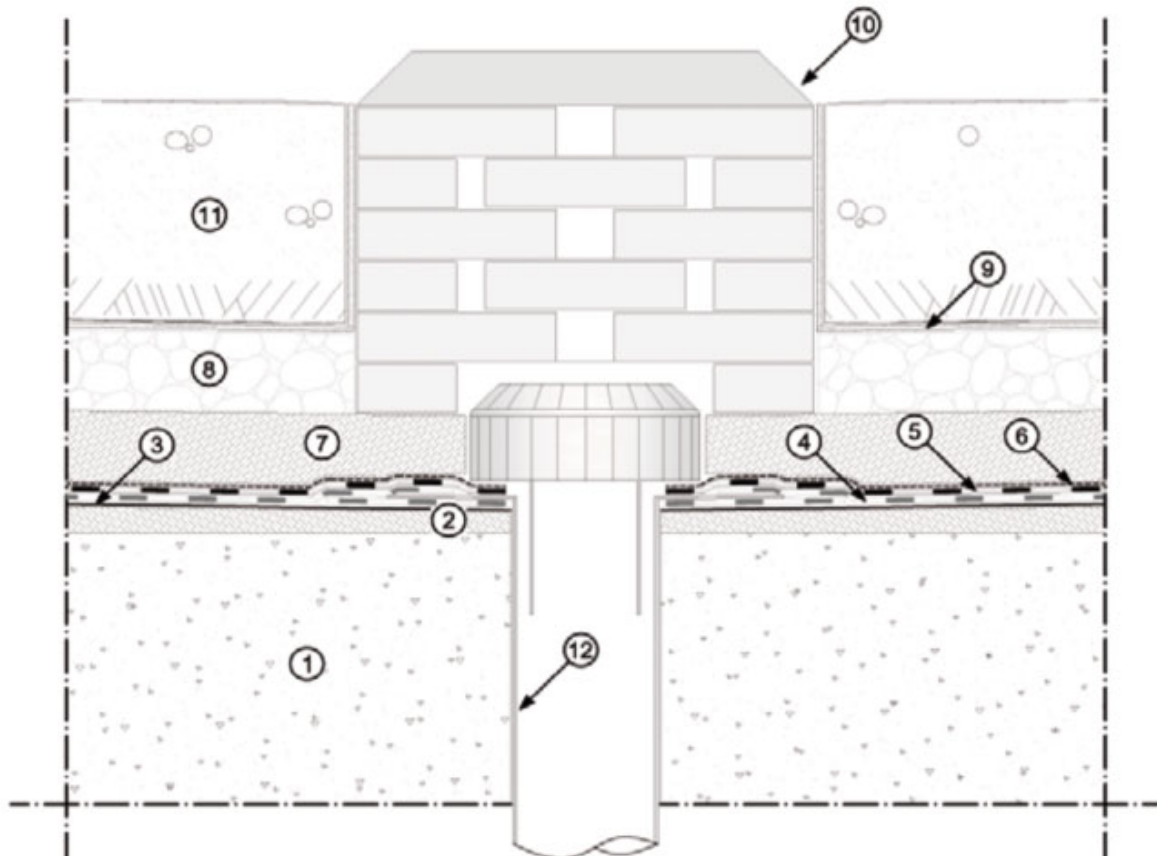
POLYGLASS  MAPEI
GROUP

- | | |
|--------------------------------------|---|
| ① Substrate | ⑧ Gravel drainage layer |
| ② Concrete sloping screed | ⑨ Non-woven fabric drainage layer |
| ③ Bituminous primer | ⑩ Garden soil |
| ④ Bituminous membrane (first layer) | ⑪ Vertical hem protected with mesh and render |
| ⑤ Bituminous membrane (second layer) | ⑫ Finishing element |
| ⑥ Double separation layer | ⑬ Shock absorbing material |
| ⑦ Protective screed | |

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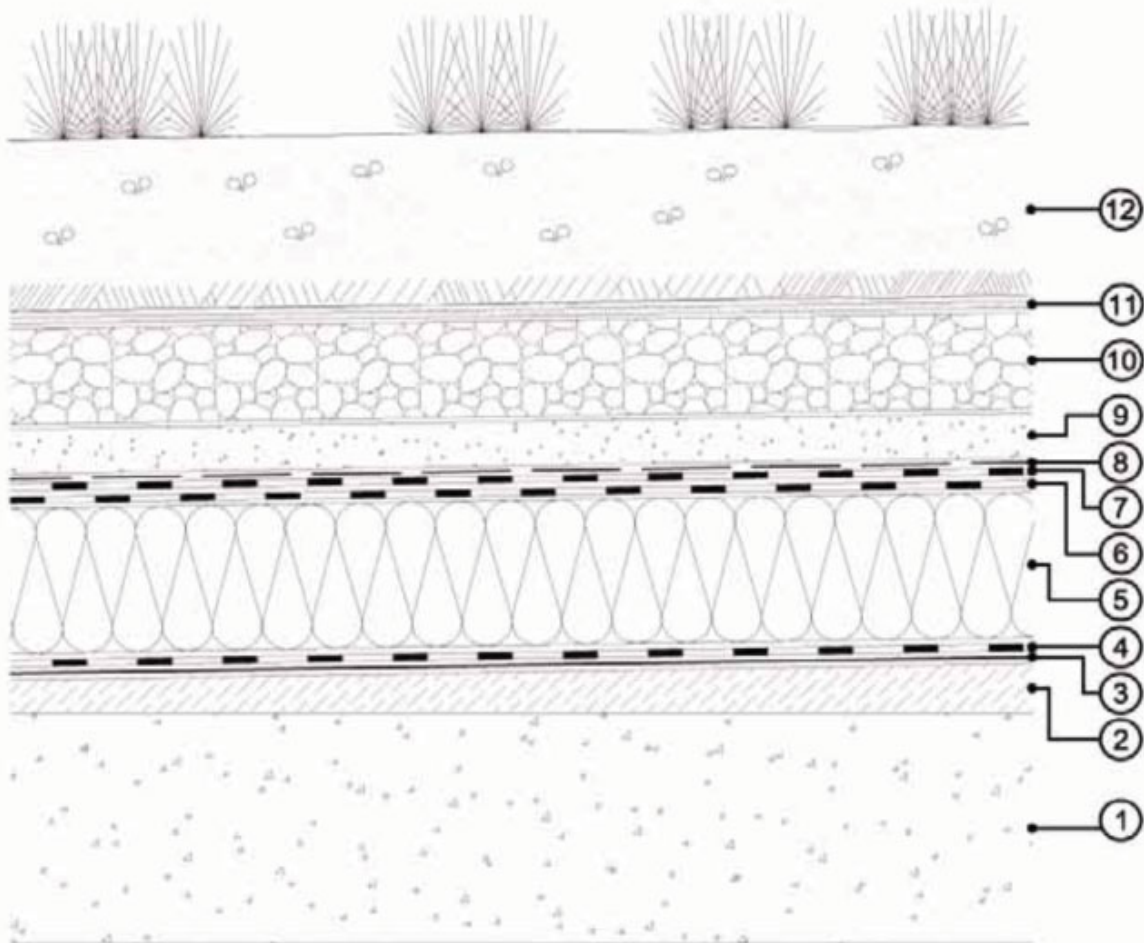
Detailed sectional view O.8.1.1

Detailed sectional view of a flat roof Roof garden Drainage fitting



- | | |
|--------------------------------------|---|
| ① Substrate | ⑧ Gravel drainage layer |
| ② Concrete sloping screed | ⑨ Non-woven fabric drainage layer |
| ③ Bituminous primer | ⑩ Brickwork honeycomb drainage column covered with non-woven fabric |
| ④ Bituminous membrane (first layer) | ⑪ Garden soil |
| ⑤ Bituminous membrane (second layer) | ⑫ Vent pipe for the waterproofing membrane (20/10 lead) |
| ⑥ Double separation layer | |
| ⑦ Protective screed | |

Stratigraphic section of a flat roof Roof garden

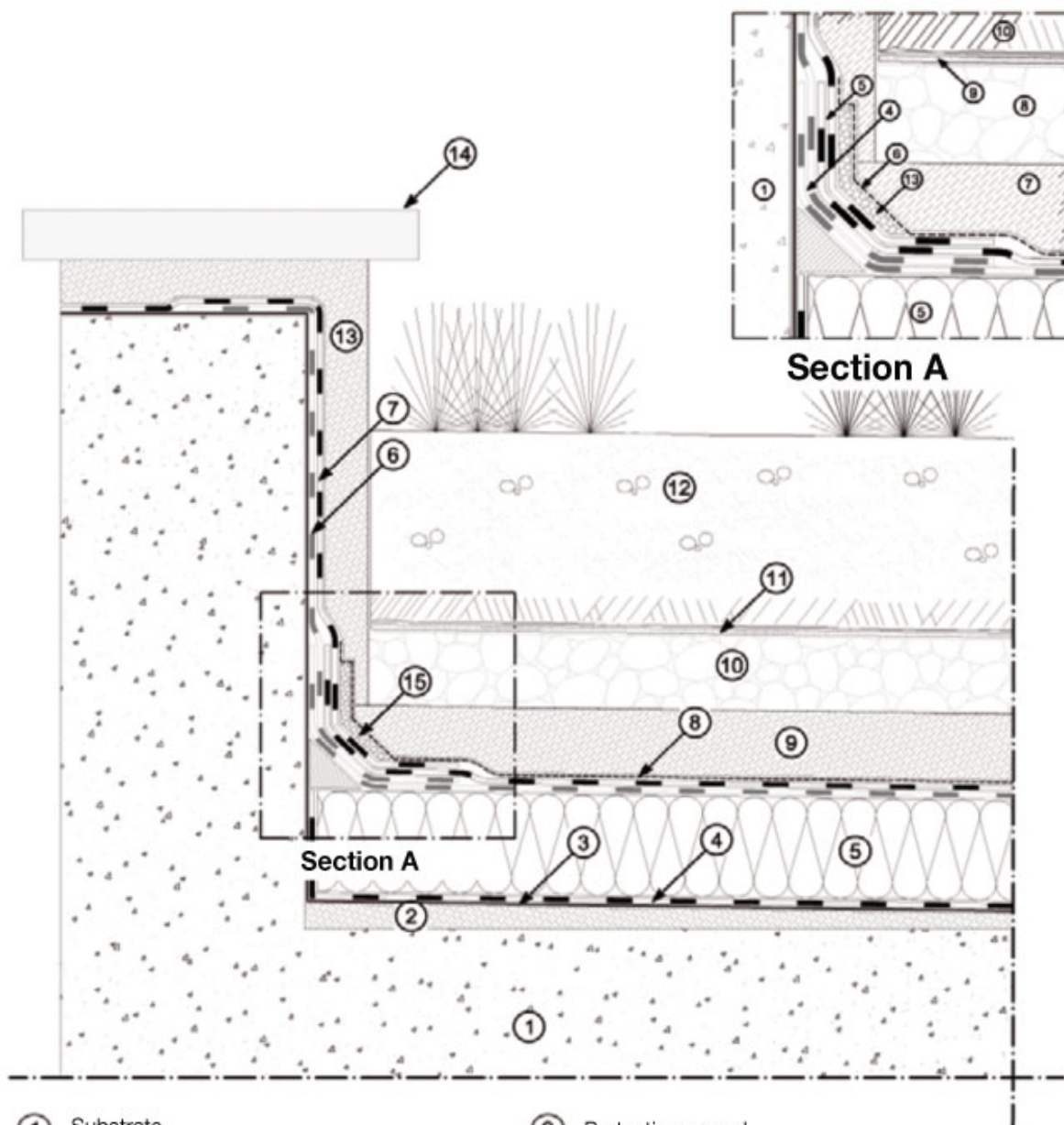


- ① Substrate
- ② Sloping screed
- ③ Bituminous primer
- ④ Vapour barrier
- ⑤ Insulating panel
- ⑥ Bituminous membrane (first layer)
- ⑦ Bituminous membrane (second layer)
- ⑧ Double separation layer
- ⑨ Protective concrete screed
- ⑩ Gravel drainage layer
- ⑪ Filtration layer
- ⑫ Soil

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Stratigraphic section O.8.2.1

Detailed sectional view of a flat roof Roof garden

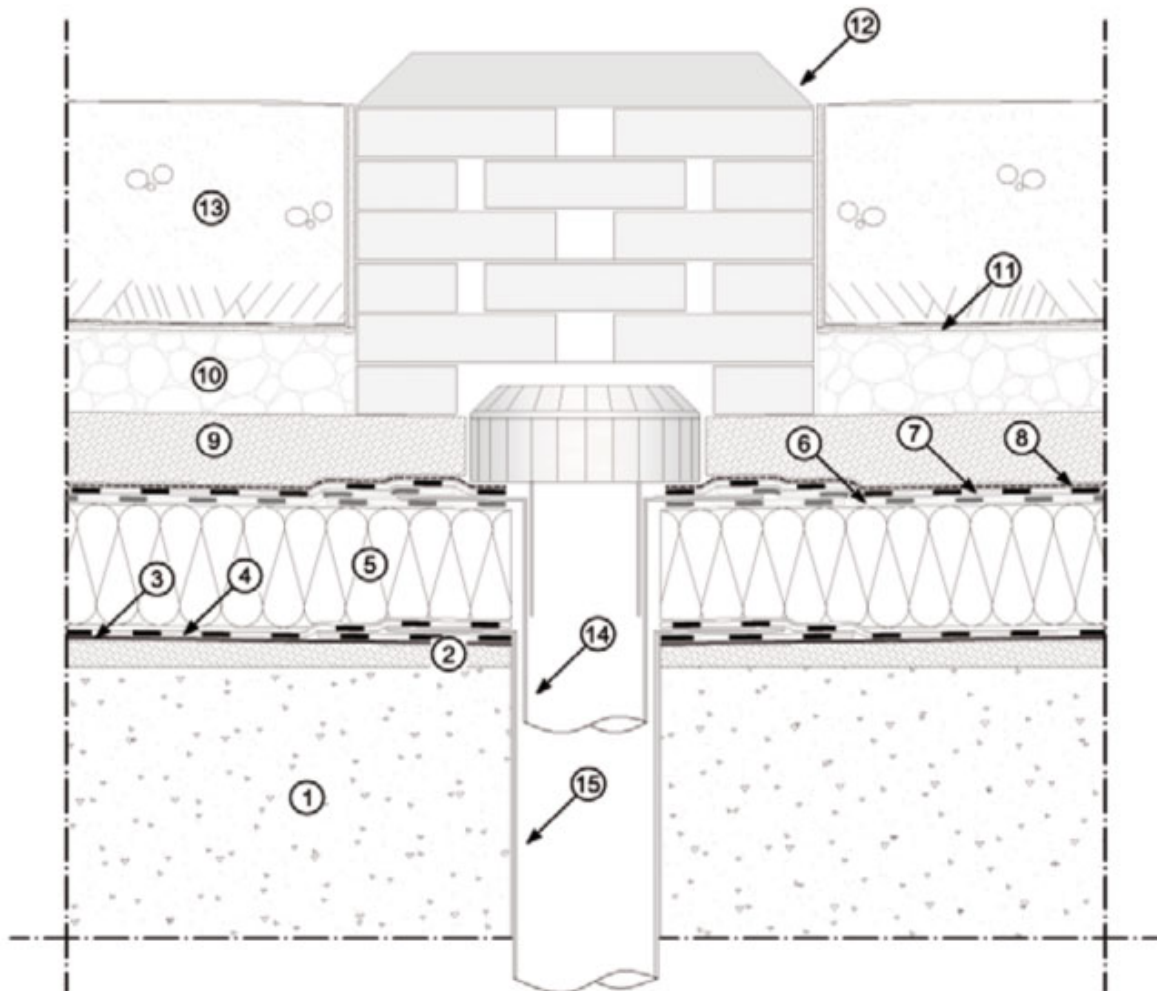


- | | |
|--------------------------------------|---|
| ① Substrate | ⑨ Protective screed |
| ② Concrete sloping screed | ⑩ Gravel drainage layer |
| ③ Bituminous primer | ⑪ Non-woven fabric drainage layer |
| ④ Vapour barrier | ⑫ Garden soil |
| ⑤ Insulating panel | ⑬ Vertical hem protected with mesh and render |
| ⑥ Bituminous membrane (first layer) | ⑭ Finishing element |
| ⑦ Bituminous membrane (second layer) | ⑮ Shock absorbing material |
| ⑧ Double separation layer | |

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Detailed sectional view O.8.2.1

Detailed sectional view of a flat roof Roof garden Drainage fitting



- | | |
|--------------------------------------|---|
| ① Substrate | ⑨ Protective screed |
| ② Concrete sloping screed | ⑩ Gravel drainage layer |
| ③ Bituminous primer | ⑪ Non-woven fabric drainage layer |
| ④ Vapour barrier | ⑫ Brickwork honeycomb drainage column covered with non-woven fabric |
| ⑤ Insulating panel | ⑬ Garden soil |
| ⑥ Bituminous membrane (first layer) | ⑭ Vent pipe for the waterproofing membrane (20/10 lead) |
| ⑦ Bituminous membrane (second layer) | ⑮ Vent pipe for the vapour barrier (8/10 stainless steel) |
| ⑧ Double separation layer | |

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Detailed sectional view O.8.2.2

Stratigraphic section of foundations Retaining walls



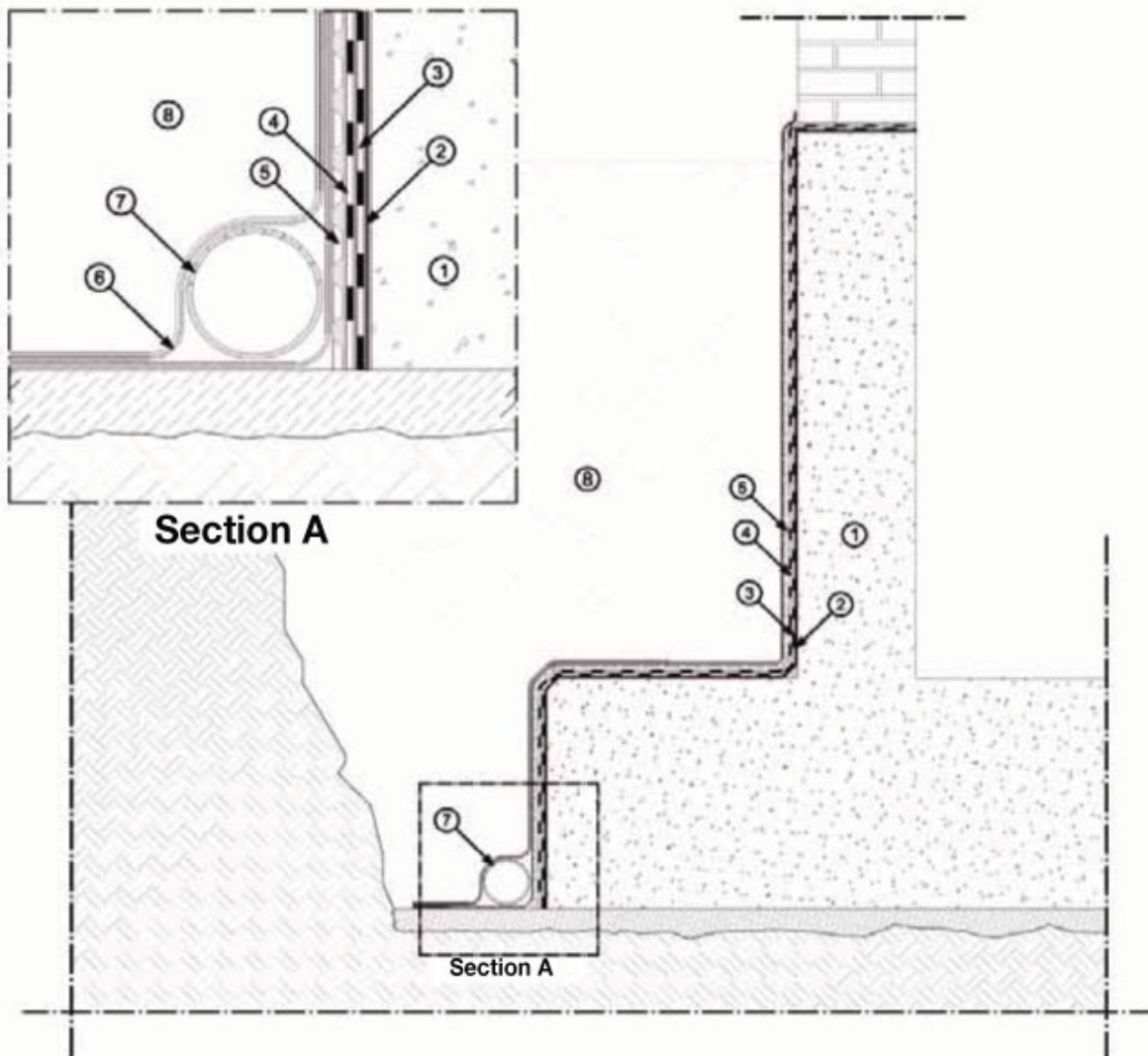
- ① Concrete wall
- ② Bituminous primer
- ③ Bituminous membrane (first layer)
- ④ Bituminous membrane (second layer)
- ⑤ POLYFOND KIT DRAIN protective drainage system

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Stratigraphic section O.9.1.1

Detailed sectional view of foundations

Retaining walls



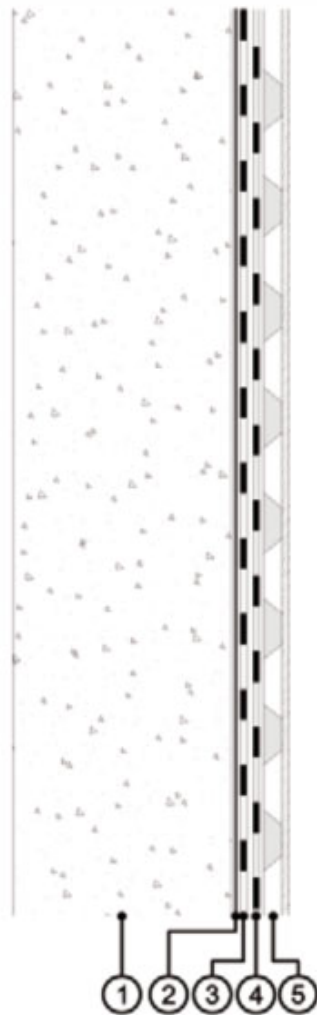
- ① Perimetral foundation wall
- ② Bituminous primer
- ③ Bituminous membrane (first layer)
- ④ Bituminous membrane (second layer)
- ⑤ POLYFOND KIT drainage layer
- ⑥ Non-woven fabric filtration layer
- ⑦ Tubular drainage sieve
- ⑧ Refill

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Detailed sectional view O.9.1.1

Stratigraphic section of foundations Retaining walls

ADESO self-adhesive membrane



- ① Concrete wall
- ② Bituminous primer
- ③ **ADESO** bituminous membrane (first layer)
- ④ **ADESO** bituminous membrane (second layer)
- ⑤ POLYFOND KIT DRAIN protective drainage system

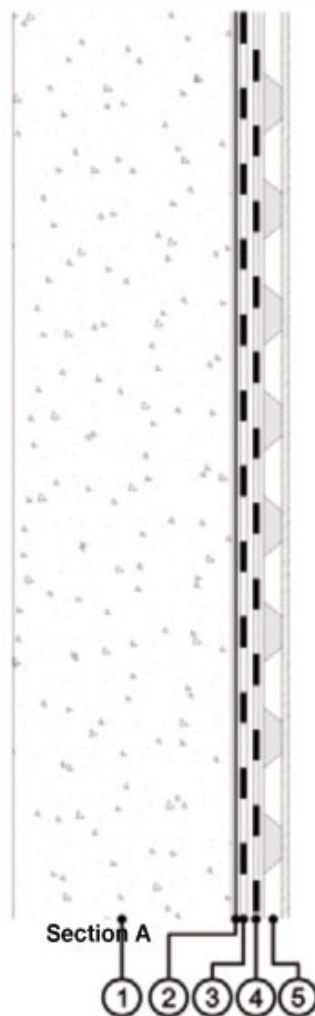
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Stratigraphic section O.10.1.1

**Detailed sectional view
of foundations
Retaining walls**
ADESO self-adhesive membrane



Section A



- ① Perimetral foundation wall
- ① Bituminous primer
- ② **ADESO** bituminous membrane (first layer)
- ③ **ADESO** bituminous membrane (second layer)
- ④ POLYFOND KIT drainage layer
- ⑤ Non-woven fabric filtration layer
- Tubular drainage sieve
- Refill

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Detailed sectional view O.10.1.1