

ROOFER'S GUIDE

2020 EDITION



SOPREMA

INTRODUCTION

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The quality of a roofing system depends on several factors that must function together towards a common objective: ensuring the long-term performance of the waterproofing complex.

The main role of a roof is to keep the building dry and protect it from the weather. In addition, the roof assembly must be designed to ensure continuous waterproofing through all elements of the building envelope. The point of contact of the roof and wall vapour barriers as well as the waterproofing of the various projections must therefore be addressed with the same care as the sealing of the roof field surface. The roof must withstand condensation and water vapour migration as well as rainfalls in order to prevent the assembly components from being contaminated.

In addition to protecting against rainfall and vapour migration, the assembly components must be stable and well fastened to the structure. The fastening and adhesion methods must allow the assembly to withstand thermal cycles and live loads in order to limit the material deformation that could compromise the waterproofing. Beyond stability of the materials, the roof system must bear the normal negative pressures exerted by the wind.

In order for a roof to meet long-term performance objectives while working as expected, other factors may be considered:

- The appropriate selection of materials
- The correct design of the assembly
- The proper installation of assembly components
- The regular maintenance of the roof

The main purpose of the Roofer's Guide is to present the best practices regarding the installation of an SBS-modified membrane system as recommended by SOPREMA.

As a preamble to the installation methods, the General Information section summarizes SOPREMA's requirements regarding surface preparation, membrane layout, slope and other elements to be considered when designing or building a roof. These requirements, unlike product installation methods, must be followed to meet the requirements of SOPREMA warranties. For more information on this subject, please read the "General Conditions for Roofing Warranties" and the Warranty section of the SOPREMA website.

In this version of the guide, emphasis has been put on the installation steps for the different types of SBS-modified bitumen membranes. Descriptions are no longer organized by product brands but by adhesion methods: torch welded – bonded with hot bitumen – self-adhesive – mechanically fastened – or bonded with adhesive.

The Guide also introduces methods for installing components

other than membrane, namely insulation panels, support panels, and main accessories, such as pitch pockets and liquid membranes.

In conclusion, this Roofer's Guide contains information that is relevant to installers, but also to professionals in charge of assembly design, as well as to site inspectors, project managers, estimators, or any other person involved in the construction market looking for answers regarding the installation of SOPREMA main roofing products.



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1.0. GENERAL INFORMATION

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1.1. Surface Preparation

One of the important steps to ensure the quality installation of each product of a roof assembly is the preparation of the surface on which the products will be installed.

To do this, using a primer before the installation of most membranes is necessary. However, exceptions will be discussed below, as well as other relevant information about primer application.



1.1.1. Primer Application

A primer must be applied before a self-adhesive or welded membrane is installed. For self-adhesive membranes, **ELASTOCOL STICK**, **ELASTOCOL STICK H₂O** or **ELASTOCOL STICK ZERO**, primers must be used. For heat-welded membranes, the primer used is **ELASTOCOL 500**.

When a membrane bonded with hot bitumen is installed on a concrete deck, a coat of **ELASTOCOL 500** must be applied.

Only the following situations don't require the use of a primer.

- COLVENT BASE 830 bonded on SOPRA-ISO PLUS or SOPRA ISO PLUS HD.
- SOPRAVAP'R on a galvanized steel deck.
- Heat-welded membranes on SOPRABOARD.
- Membranes bonded with cold adhesives (for example, COLPLY and SOPRATAACK).



There may be exceptions. Consult SOPREMA technical bulletins or documents from the various roof support panel manufacturers on this topic.

1.1.2. Tools Required

Primer can be applied using the following tools:

- brushes;
- rollers;
- paint brushes (for small surfaces);
- sprayers (for large surfaces).



1.1.3. Drying Time and Coverage Rate

Self-adhesive membranes must be installed as soon as possible once the primer has dried, or within 2 to 3 hours after application of the primer. Waiting too long before their installation could contaminate the primed surface and reduce the adhesion performance between the self-adhesive membrane and the primer. When in doubt, always add a coat of primer.

Primers used for heat-welded membranes can be applied a few days in advance without causing adhesion problems.



Never use a torch to check if a primer is dry. Use your bare hands, making sure primer is dry to touch and that the film doesn't stick to your skin.

	DRYING TIME ¹	COVERAGE RATE ²	APPLICATION TEMPERATURE
ELASTOCOL 500	1 to 12 hours	0.15 to 0.25 L/m ² (0.375 to 0.625 US gal/100 ft ²)	No limitation
ELASTOCOL STICK H ₂ O	0.5 to 3 hours	0.1 to 0.3 L/m ² (0.25 to 0.75 US gal/100 ft ²)	-4 °C (25 °F) Conditioned at 10 °C (50 °F)
ELASTOCOL STICK	0.25 to 1 hour	Porous substrate: 0.3 to 0.5 L/m ² (0.75 to 1.25 US gal/100 ft ²) Smooth substrate: 0.1 to 0.25 L/m ² (0.25 to 0.625 US gal/100 ft ²)	-10 °C (14 °F)
ELASTOCOL STICK ZERO	0.5 to 1.5 hours	Porous substrate: 0.2 to 0.4 L/m ² (0.50 to 1.00 US gal/100 ft ²) Smooth substrate: 0.1 to 0.25 L/m ² (0.25 to 0.625 US gal/100 ft ²)	-10 °C (14 °F)

1. The drying time of primers may vary depending on temperature and relative humidity. Drying times in the table above are indicative only.

2. Coverage rate is approximate and may vary depending on the porosity and condition of the substrate as well as the application technique.

1.2. Properties of the Different Substrates

Surface preparation depends not only on the type of membrane installed, but also on the type of substrate. Special care must be taken according to the substrate type: concrete, wood or metal. The following section presents the particularities of several materials not manufactured by SOPREMA that are commonly found in construction projects. In such cases, these are recommendations only and approval may be required from the substrate manufacturers

The table below shows which type of primer can be used on different substrates.

SUBSTRATE TYPE	TYPE OF PRIMER			COMMENTS
	ELASTOCOL STICK, ZERO, H ₂ O	ELASTOCOL 500	No primer required	
CONCRETE				
Structural concrete	✓	✓		
Cellular concrete	✓	✓		
Soundproofing concrete	✓	✓		
WOOD				
Plank	✓	N/A		A non-bituminous cover panel is recommended prior to membrane installation.
Plywood	✓	✓*		*With membranes bonded with adhesive only
OSB	✓	N/A		
Pressure-treated wood	✓	N/A		
Surface-treated wood	N/A	N/A		The installation of membranes on this type of substrate is not recommended.
Cross-laminated timber (CLT)	✓	N/A		
METALS				
Steel deck	✓		✓*	Optional according to the condition of the substrate. *SOPRAVAP'R
Prepainted steel (flashing)	✓			Not required for heat-welded membranes
Galvanized steel	✓	✓		
Stainless steel	✓	✓		
Aluminum	✓	✓		
Copper	✓	✓		

1.2.1. Concrete Surfaces

Concrete must be fully cured before application of the membranes.



Consult the contractor who poured the concrete for more details about concrete curing on a specific project.

A minimum curing time of 10 to 14 days is generally required in the summer. A longer period may be required in other seasons. Curing time also depends on the thickness and density of the concrete.

Surfaces must be dry, clean, and free of loose particles, formwork and curing products, irregularities, slurry, laitance etc.

Concrete slabs must always be primed according to type of membrane installed.

Surfaces must have a concrete surface profile (CSP*) of 2 to 5 for all types of modified bitumen membranes.

Protrusions along concrete formwork and construction joints must not exceed 5 mm (3/16 in).

All holes over 5 mm (3/16 in) must be filled with bitumen or fast-setting concrete, depending on the surface condition.

1.2.2. Wood Deck

1.2.2.1. Planks

Wood decks are usually made of softwood, with sap that dissolves bitumen. This could cause significant deterioration of the membrane and creates streaks of bitumen under the plank deck.

There could be severe consequences to installing membranes over softwood planks. The membranes and the deck itself may even have to be completely replaced.

If there is a risk that the membranes will be affected by sap, SOPREMA recommends not installing a bituminous membrane directly on the plank deck, whatever its function (vapour barrier or waterproofing membrane).

If this type of deck is made of old planks, the surfaces may be irregular, and the presence of used nails and screws could carry a high risk of membrane perforation.

To prevent problems related to this type of substrate, it is recommended to install cover boards mechanically fastened or bonded with **DUOTACK** adhesive to the planks before the application of the membrane.

1.2.2.2. Plywood Boards

Although this type of wood carries little risk linked to resin or old mechanical fasteners, membrane delamination or wrinkles may occasionally occur at the junctions of the boards when using a fully adhered system.

Wrinkles typically appear soon after installation of the membrane, particularly when humidity in the boards evaporates.

*As per the International Concrete Repair Institute.

To prevent this occurrence, SOPREMA recommends installing cover boards mechanically fastened to the plywood boards before application of the membranes. Alternately **SOPRAFIX** or **COLVENT** can be installed directly to a plywood substrate. This measure is not required for plywood on parapets or roofing flashings waterproofed with self-adhesive membranes.

1.2.2.3. Oriented Strand Boards (OSB)

Like plywood, this type of wood also presents little risk associated with resin or old mechanical fasteners. However, when this type of board is used, the surface treated against moisture should always be installed face down.

If not, an adhesion test must be performed to ensure that the treated surface does not affect membrane adhesion and is comparable to untreated surfaces.

1.2.2.4. Treated Wood

Pressure-treated wood, whether fire or humidity resistant, is not required in SOPREMA's waterproofing systems. However, when used, the following recommendations apply:

Self-adhesive, hot-bitumen or adhesive-bonded membranes can be installed on pressure-treated wood provided the surface is primed with a primer suitable for the installation of the base sheet membrane.

Surface-treated wood (with a preservation treatment applied using a paint brush or roller) is not an appropriate substrate, no matter what type of membrane is installed. The treatment compromises adhesion of the waterproofing membrane to the wood. However, you may treat the surface of the cut ends of pressure-treated wood.

1.2.2.5. Cross-Laminated Timber (CLT)

It is not possible to confirm whether the type of wood used for cross-laminated timber deck involves risks related to sap. If uncertain, it is better to install non-bituminous cover boards mechanically fastened or bonded with **DUOTACK** adhesive to the planks before application of the membrane.

If the contractor confirms that there is no risk for the membranes, then they can be installed provided that the surface is primed with a primer suitable for the installation of the base sheet membrane.

1.2.3. Steel Deck

Gypsum boards, concrete boards or thermal insulation boards installed on a steel deck must have a bearing capacity based on the space between the top flutes (deck flute spanability).

Asphaltic panels and 12.7 mm (½ in) high-density polyisocyanurate boards are not designed for direct installation on a steel deck.

1.3. Compliance with Standards of Different Fastening Methods of Roof System Components

To ensure the performance of roofing materials that are mechanically fastened, bonded with adhesive or ballasted, it is very important to use the appropriate quantity of mechanical fasteners, adhesive or ballast according to the roof zone.

The roofs are divided into three zones:

- the field surface;
- the roof perimeter;
- the corners.

For most projects, the required number of mechanical fasteners and amount of adhesive varies from zone to zone.

For more details about the required quantity of adhesive or mechanical fasteners, consult the Wind Uplift Resistance Testing reports according to Canadian Standard CSA A123.21 or publications according to FM 4470 (RoofNav Database) including recommendations for corners and perimeters listed in the PLPDS 1-29 from Factory Mutual.

Roofs with asphalt and gravel cover are not considered ballasted. It is therefore necessary to use an appropriate quantity of mechanical fasteners and adhesive to resist the wind pressure determined for each roof area.

The wind uplift resistance of protected membrane roofs is obtained through the ballast which will be laid on the insulation. This weight also keeps the insulation in place during heavy rains. Before laying the ballast material, always install either a filter layer or a drainage panel. Finally, to make sure that the structure is sufficiently resistant, the load capacity must be assessed by an engineer.

There is no standard or test protocol in Canada for assessing the wind uplift resistance of a ballasted roof. The ANSI/SPRI RP-4 standard proposes a theoretical calculation method for the required weight, but it does not include a wind speed chart for the various regions of Canada. However, in order to use the Canadian climatic informations in the ANSI/SPRI RP-4 standard, the Canadian Roofing Contractors Association (CRCA) published in their Volume 40 Technical Bulletin, a mathematical formula to convert the wind pressures, written in the National Building Code (NBC), to wind speeds.

To make sure that the roofing assembly can adequately resist wind loads and that the insulation will remain in place during heavy rain, the minimum criteria—such as those recommended by CRCA in their Technical Bulletin, Volume 35—should be respected.

The responsibility for determining the weight required for a particular project and for selecting a type of ballast material must be assumed by the project designer or project manager.

REQUIRED QUANTITY OF BALLAST DEPENDING ON INSULATION THICKNESS				
	MINIMAL BALLAST WEIGHT			
	REGULAR DRAIN		CONTROLLED FLOW DRAIN	
Thickness of SOPRA-XPS insulation panel mm (in)	Field Surface kg/m ² (lb/ft ²)	Perimeters, Corners and Penetrations kg/m ² (lb/ft ²)	Field Surface kg/m ² (lb/ft ²)	Perimeters, Corners and Penetrations kg/m ² (lb/ft ²)
50 (2) AND LESS	50 (10)	60 (12)	60 (12)	
75 (3)		84 (17)	101 (20)	
100 (4)		108 (22)	141 (29)	
125 (5)		132 (27)	182 (37)	
150 (6)		156 (32)	222 (45)	
175 (7)		180 (37)	283 (54)	
200 (8)		204 (42)	304 (62)	

1.4. Layout of Membranes

The recommendations that follow generally apply to all membranes in order to obtain high-performance waterproofing. If some acceptable exceptions or alternatives apply to particular products, they will be addressed in this guide in the Installation Section of the membrane type in question.

The layout of overlaps indicated in the text represents minimal limits. These limits prevent excess thickness of membranes and facilitate the placement of overlaps.

Please note that certain site conditions may make it impossible to fully comply with these provisions. It is still possible to achieve a quality installation without following these recommendations only if special attention is given to overlaps during the installation and inspection of the works.

The layout of the base sheet and cap sheet membranes is traditionally done by offsetting each end lap joint. However, there is an alternative method with the use of overlapping strips centred on the end lap joints. The **SOPRALAP** overlapping membrane allows base sheets to be installed without offsetting the end lap joints. **SOPRALAP** is mandatory with 2-in-1 and 3-in-1 panels as well as **COLVENT** membranes. For safety matters, mechanically fastened base sheet membranes must be installed with **SOPRALAP**. This alternative method can also be used with all types of SOPREMA base sheets.

General recommendations:

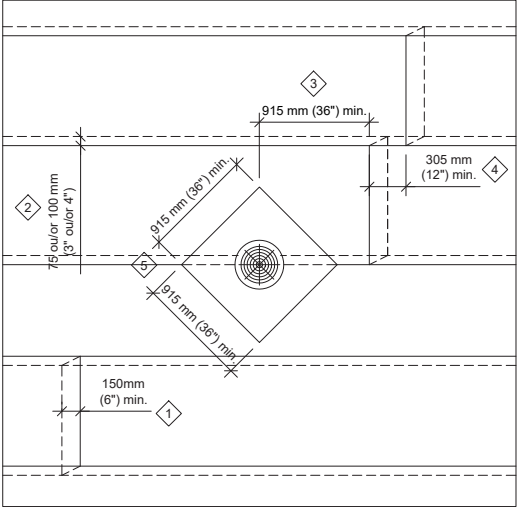
- Ensure membrane has been properly preconditioned
- Place the rolls where they will be used. Always start at the lowest point of the roof.
- Unless otherwise stated, side laps should be at least 75 mm (3 in) or 100 mm (4 in) following the lines provided for this purpose according to the type of membrane used.
- For base sheet and cap sheet membranes of the field surfaces, end laps must be 150 mm (6 in).
- For flashing base sheet membranes, the overlap on the base sheet of the field surface shall be 100 mm (4 in).
- For flashing cap sheet membranes, the overlap on the cap sheet of the field surface shall be 150 mm (6 in).
- In order to prevent excessive thickness of membranes, the end laps must be offset from the underlayment joints by at least 305 mm (12 in). Cap sheet end laps must be offset by a minimum of 305 mm (12 in). The same rule applies for the overlapping of flashing membranes with the membranes of the field surface.



1.4.1. Layout of the Base Sheet on Field Surfaces

Interior slope with drain

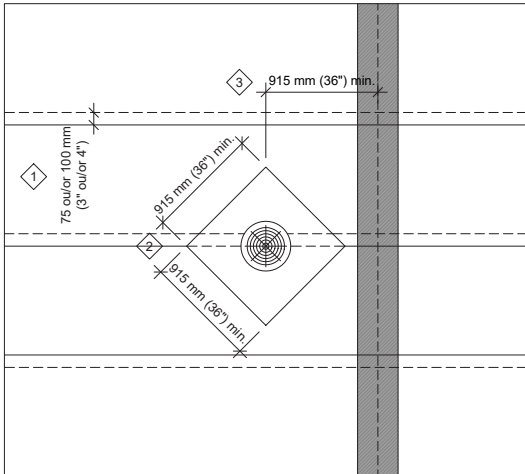
Traditional Method



- 1. End lap joints
- 2. Side lap joints
- 3. Minimum distance between the centre of the drain and end lap joints on base sheet membranes overlapping the drain
- 4. Minimum distance between end lap joints of base sheet membranes that are overlapping
- 5. Dimensions of the reinforcement membrane at the drain



Alternative Method with SOPRALAP



1. Side lap joints
2. Dimensions of the reinforcement membrane at the drain
3. Minimum distance between the centre of the drain and end lap joints on base sheet membranes overlapping the drain

1.4.1.1 Placement of Base Sheet Membranes

Unroll the membrane making sure the side lap joint is aligned with the centre of the drain (Figure 1);

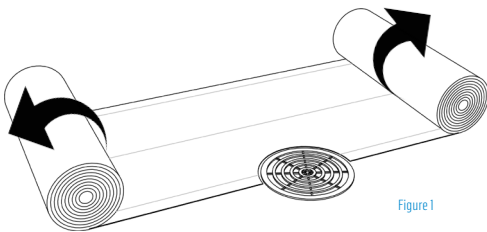


Figure 1

Re-roll one end towards the centre;

Install this first half of the membrane;

Proceed with the opposite half.

At the time of the execution of the end laps, it is important to cut at an angle the corner of the membrane located on top of the end lap joint which will then be covered by the adjacent roll.

Install a reinforcement membrane diagonally (45°) around drains,

vents and pitch pockets. These accessories must first be primed and the reinforcement membranes must overlap them by at least 150 mm (6 in).

Metal flashings at the edge of the roof must be covered with a reinforcement strip of at least 150 mm (6 in) wide centered along the edge of the metal.

1.4.2. Temporary Waterproofing

When continuous waterproofing is impossible, the temporary waterproofing of base sheet membranes must be done cautiously on all field surfaces, perimeters and curbs. Improper waterproofing can compromise the integrity of the materials by allowing water infiltration before the waterproofing system prior to completion.

The use of a sealant bead at the end of the membranes carries a risk of infiltration and is not recommended.

It is always recommended to install the flashing base sheets immediately after the field surface base sheets are laid. However, if site organization does not allow it, the following methods are recommended:

Turn up the base sheet of the field surface by approximately 50 mm (2 in) on the perimeters and curbs. Otherwise, a 150 mm (6 in) piece of membrane must be installed at all transition after the base sheet is installed on field surfaces. This will allow a temporary sealed system to be obtained before applying the base sheet to the flashings.

In the case of a base sheet adhered to oxidized bitumen, do not apply bitumen higher than 50 mm (2 in) vertically on the flashings.

For temporary waterproofing on field surfaces, it is better to use a self-adhesive membrane strip to waterproof between the base sheet and the vapour barrier or the deck. Work should be paused so that water runoff is directed opposite to the sections of insulation and membranes already installed (Figure 2).

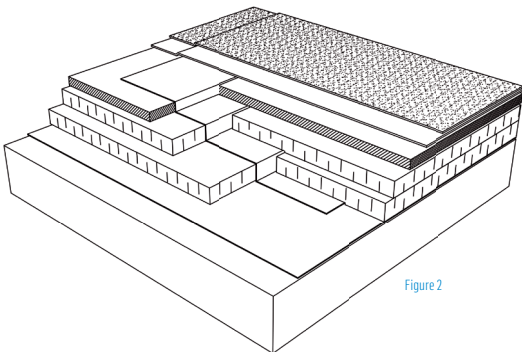
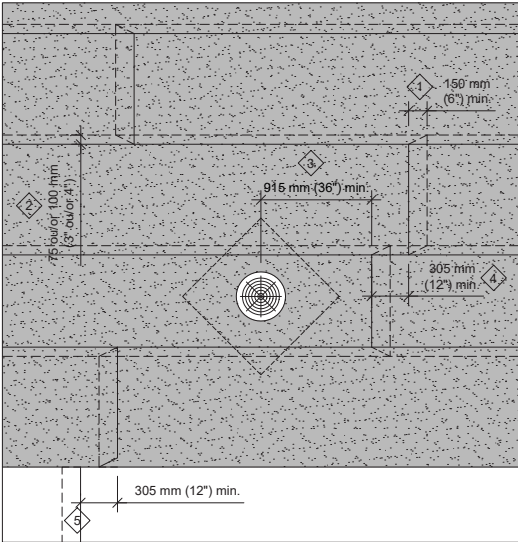


Figure 2

1.4.3. Layout of the Cap Sheet Membranes on the Field surface



1. End lap joints
2. Side lap joints
3. Minimum distance between the centre of the drain and end lap joints on cap sheet membranes overlapping the drain
4. Minimum distance between end lap joints of cap sheet membranes that are overlapping
5. Minimum distance between cap sheet and base sheet membranes end laps.

1.4.3.1. Placement of Cap Sheet Membranes

Unroll the membrane making sure that the side lap joint runs along the line on the centre of the base sheet surface so the cap sheet membrane is centred on the drain (Figure 3);

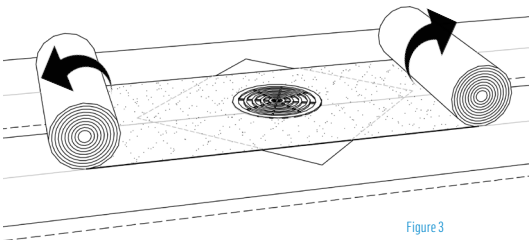


Figure 3

End lap joint must be at least 915 mm (36 in) from the drain.

Re-roll one end towards the centre;

Install this first half of the membrane;

Proceed with the opposite half.

At the time of the execution of the end laps, it is important to cut at an angle the corner of the membrane located on top of the end lap joint, which will then be covered by the adjacent roll.

If a starter membrane is not used, create a side lap joint selvedge of 75 mm (3 in) or 100 mm (4 in) on the opposite side of the existing selvedge, according to the membrane type. Snap a chalk line and embed the granules with a torch for welded membranes. For adhesive-bonded or self-adhesive membranes, embedment will be replaced by the use of cold adhesive. In the case of membranes adhered with SEBS-modified bitumen, embedment is not required.

1.4.4. Layout of Flashing Membranes

SOPREMA requires no minimum height when creating a junction between a roof and a vertical upstand¹. However, the membrane termination must be perfectly sealed with a metal flashing or a termination bar.

Upstands must be covered with 1 m (39 in) wide membrane strips installed vertically. The overlaps of the flashing membrane must be offset so that the membranes covering the vertical face of the flashing do not coincide with those covering the field surface.

For flashing base sheet membranes, the overlap on the base sheet of the field surface shall be 100 mm (4 in).

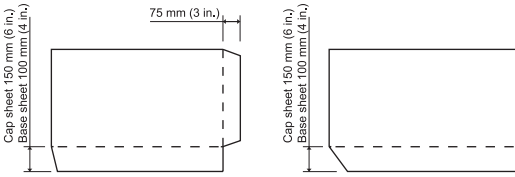
For flashing cap sheet membranes, the overlap on the cap sheet of the field surface shall be 150 mm (6 in).

1. Provincial associations may have requirements regarding minimum heights as part of their warranty program.

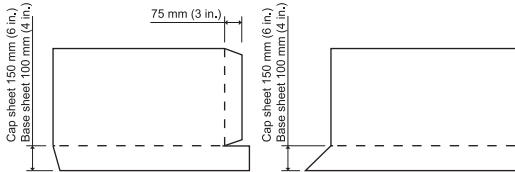


1.4.4.1. Membrane Cutting

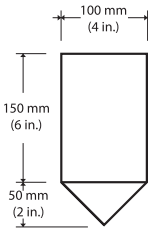
Inside corners



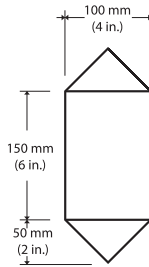
Outside corners



Gussets without cant strip



Gussets with cant strip



Gussets are mandatory at every angle, whether interior or exterior, at the transition of the field surface.

1.4.5. Use of Cant Strips

Cant strips are not required in SOPREMA systems, because the materials made of elastomeric bitumen with robust reinforcement are highly flexible (even at low temperatures), which helps them to easily fit the shape of various substrates.

If a cant strip is used, please note the following limitations:

- Self adhered membranes must only be adhered directly to a wood cant.
- Uncoated mineral wool fibre cant strips are not permitted in SOPREMA's system.

1.4.6. Use of Fastening Bars at the Perimeter

The use of fastening bars at the perimeter of the roof is not required as part of the warranties offered by SOPREMA. However, SOPREMA encourages the use of fastening bars when the waterproofing system is installed with oxidized bitumen. They reduce the risk of the membrane moving as well as the development of wrinkles.

1.5. Slope

To prevent granule loss, which may result in the premature aging of the membrane, the slope of all the roofing systems must be at least 1% (1/8 in per ft). The roof slope must be even and continuous towards the drains.

There must be a gentle slope around the drain to prevent the membrane from wrinkling at this location when it is applied. Opt for prefabricated sumps made of polyisocyanurate.

When the lowest level of the roof is a junction between structural elements, install backslope crickets to direct the flow of water towards the drains.

Depending on the slope and the method of installation, it is recommended to install the membranes vertically (from bottom to top).

- Welded: $\geq 8\%$ (1:12)
- Bitumen: $\geq 3\%$ (3/8:12)*
- Self-adhesive: $\geq 33\%$ (4:12)
- Mechanically fastened: $\geq 8\%$ (1:12)
- Adhesive: $\geq 8\%$ (1:12)

*Above 8%, SOPREMA recommends using a roof system other than those bonded with hot bitumen.

1.6. Storage and Handling

After the rolled materials are delivered, carefully store them in an upright position, with the selvedge side on top.

Rolls are shipped on shrink-wrapped pallets. If the products are stored outside, cover them with an opaque protection cover after the packaging provided for delivery has been removed.

All types of panels must be stored on a flat substrate and sheltered from inclement weather. If the products are stored outdoors, cover them with an opaque protection cover.

In cold weather, store sealants and solvent-based mastics at a warm enough temperature to ensure the required flexibility for application. Unwrap these products at the same rate as they are applied on site.

2.0. MEMBRANE INSTALLATION METHODS

2.0. MEMBRANE INSTALLATION METHODS

2.1. Heat-Welded Membranes

Heat-welded membranes are preferred due to their efficiency when it comes to installation temperatures and site conditions.

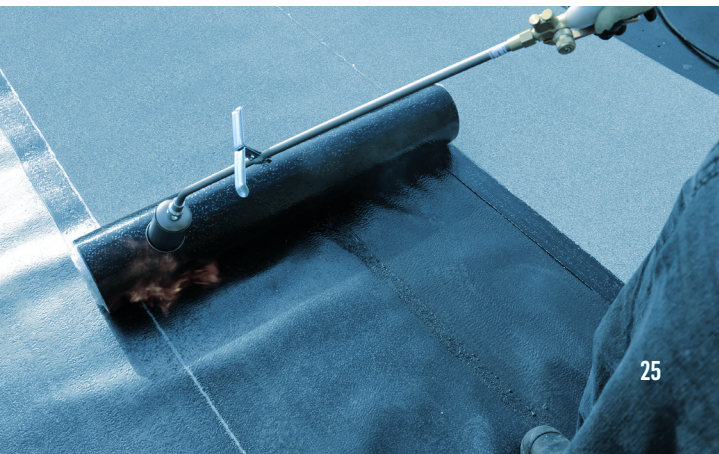
Of course, the use of a propane torch, with the benefits of facilitating installation in cold weather, requires careful handling to ensure the safety of installers and residents alike, as well as the integrity of the building.

In all cases, the contractor must identify the areas at risk before the start of the project and provide safe solutions.

For safety reasons, heat-welded membranes must never be installed directly on wood or near combustible products or substrates.

Non-combustible cover panels, such as asphaltic or mineral fibre (rockwool) panels with bituminous surface, as well as flame shields, must be used to prevent the flame from directly touching the wooden substrate.

For more information on safe practices for propane use, please consult the following document: *Safety Guidelines for the Installation of Roofing Products*.



2.1.1. Limitations

There is no temperature limit for heat-welded membranes. This is why they can be installed efficiently even in winter conditions.

However, in very cold weather, some special work methods are recommended to ease their installation.

It is recommended to use a safe device complying with the applicable standards to keep the propane tank at the required temperature.

Using the torch, slightly heat the last two metres of the cap sheet membranes near the mandrel. This operation reduces the tension inherent in the reinforcement.

Do not re-roll the membrane as tight as you would during the summer. The last two metres of the membrane will be easier to weld if it is rolled more loosely.

When available, use a winter grade membrane with softer reinforcement than the normal grade.

2.1.2. Conditioning of Membranes

It is recommended to completely unroll the membrane 10 to 15 minutes before the installation, regardless of the temperature. This procedure releases the tension accumulated in the membrane during manufacturing and eases the application for the installer.

When the temperature is below 0 °C (32 °F), it is recommended to burn the plastic film of the upper face of the base sheet in a zigzag pattern (Figure 8).

It is not required to burn the plastic film from the underside of the cap sheet membranes. However, in cold weather, some installers prefer to perform this operation to ease the welding of the membrane.



Note: Adhesive tapes used to keep membranes rolled-up must be removed from all membranes before they are installed. Otherwise, it may compromise adhesion and cause blistering. Adhesive tape also emits toxic fumes if exposed to a torch flame.



2.1.3. Installation Methods

2.1.3.1. Field surface

Maintain the appropriate distance between the end of the torch head and the roll. This distance varies from approximately 150 to 305 mm (6 to 12 in), depending on surrounding conditions (Figure 4). This distance must be maintained to get the maximum heat and proper diffusion of the flame. The hottest part of the flame is located at the tip of the blue portion.

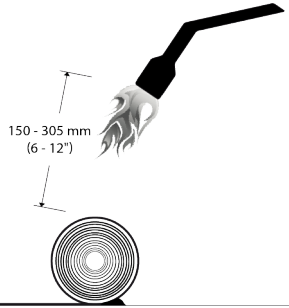


Figure 4

Before beginning to weld, pay special attention to the following points:

Know the product you are welding: its thickness, reinforcement, and type of underface (sanded or polypropylene).

Know the type of material to which you are welding this product: directly to concrete, to another membrane, or to a board that can be welded to.

Take into consideration the weather conditions. The speed of welding depends on the temperature, humidity and wind conditions. Propane consumption is also affected by these elements.

Welding speed decreases in cold, humid weather, and increases in hot, dry weather. The speed may even vary over the course of a day. To control these differences, just perform a few tests when you are ready to install the first roll, or whenever conditions change (for example, heat the roll over a few centimetres, stop, back-roll the roll, check the uniformity of the weld and adjust your pace based on the results).

The weld will be more effective if the movement of the torch, and hence its flame, is continuous and even, in a rectangular pattern (Figure 5).

The torch head position shown is recommended for obtaining the best welding technique.

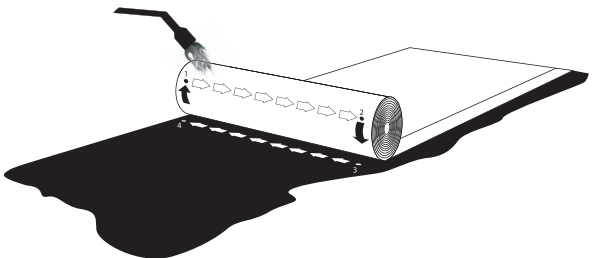


Figure 5

Never point the flame (torch head inverted) between the two layers. This may trap air and cause fishmouths or wrinkles in the layer (Figure 6).

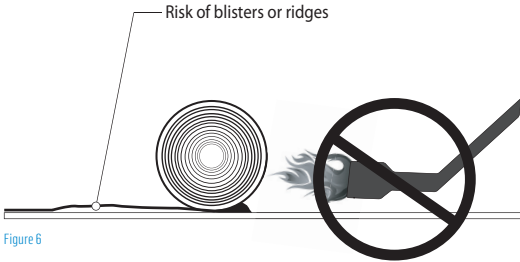
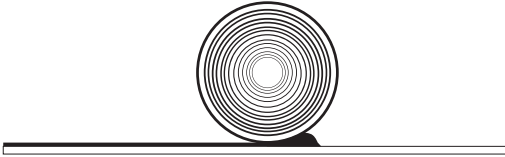


Figure 6

For best results, make sure there is always a small string of melted bitumen in front of the roll being installed (Figure 7). When in doubt, re-roll the roll – “hairs” of bitumen should appear across the length of the roll.



Always unroll membranes in a continuous fashion. Starting and stopping mid-roll may cause slight undulations in the surface.

Along the side lap, keep the flame pointed towards the inside of the roll to prevent burning of the granulated surface.

It is recommended to create a bleed out of 3 to 6 mm (1/8 to 1/4 in) to visually confirm membranes are waterproof. For aesthetic reasons, when there is excessive bleed out on cap sheet membranes, you may cover it with bulk granules.

Why and How to Embed Granules?

Why?

The purpose of embedding granules is to prepare the overlapping joint for the next cap sheet membrane. This operation is not only recommended but MANDATORY because the embedding of the granules guarantees a suitable weld at these critical spots. Embedding the granules will provide bitumen-to-bitumen adhesion. If the granules are not embedded, the bond or weld could be inadequate and may even cause peeling.

How?

To embed the granules, heat the granulated surface with a torch to soften the bitumen. When the bitumen becomes shiny and the granules begin to sink slightly, stop heating and embed the granules in the bitumen using a trowel. A hot trowel will slide easily and prevent granules from sticking to it.

In some cases, a specifically designed granule embedder can be used.



Note : It is important to embed the granules by sliding the trowel over the surface and not to scrape off the granules and bitumen. Always keep your trowel clean.

2.1.3.2. Flashings

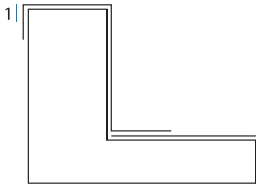


Important safety notes:

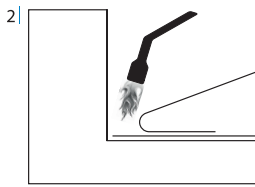
- Under no circumstances should membranes be welded on or near combustible substrates.
- Install a fire-stop membrane wherever flames can enter.
- Never use the torch on a surface where a solvent-based product has been freshly applied (wait for it to dry).
- Do not torch on enclosed surfaces, such as underneath air conditioning units or behind counter flashings.
- Voids, holes or gaps in or near the substrate have to also be protected to prevent flame penetration.
- Make sure that there is no ventilation or negative pressure to attract or fan the flame.

Weld the membrane over the flashings using the method shown on the next page.

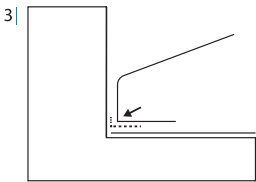




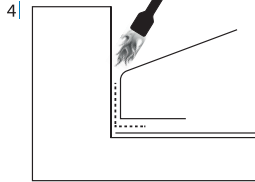
Check the dimensions and adjust as required.



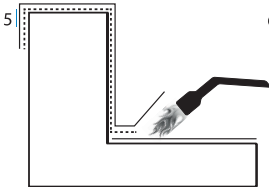
Torch corner.



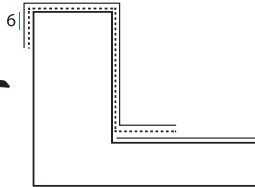
Press into corner.



Torch upwards.



Torch overlap.



Torching completed.

2.2. MEMBRANES BONDED WITH HOT BITUMEN

(Oxidized asphalt or SEBS-modified bitumen)

Hot bitumen is a conventional method for adhering waterproofing membranes to substrates. Although it has been replaced with more efficient, safer and less restrictive methods, it is still a cost-effective way of ensuring adherence of SBS-modified bitumen membranes.

The bitumen temperature and application technique used are determining factors for successful adhesion. Other factors that may influence the quality of the installation include the ambient temperature and atmospheric conditions.

As indicated in the ACEC Volume 43A Technical Bulletin, "the application of modified bitumen membranes (particularly in cold weather) may require special techniques to prevent the stiffening of materials and inadequate adhesion, and to ensure that proper bitumen temperature at the point of application. [...] In the winter, asphalt should be as hot as safely possible to compensate for the more rapid cooling rate. Failure to do so will result in poor membrane adhesion".

2.2.1. Limitations

The type of oxidized bitumen is normally selected according to the slope.

- Type II: 1% to 2% (1/8 to 1/4 in per foot)
- Type III: 1% to 25% (1/8 to 3 in per foot)

SEBS-modified bitumen has no limitation regarding the slope.

The use of oxidized bitumen for the adhesion of an SBS-modified bitumen granular cap sheet membrane is not permitted.

Using a bitumen spreader or a bucket is not acceptable.

Bitumen must be heated to a sufficiently high temperature to obtain quality adhesion of the membrane to the substrate. The minimum temperature for hot bitumen to bond to the membrane on contact is 218 °C to 232 °C (425 °F to 450 °F).

Hot bitumen can be used in the winter only if the worksite organization allows the temperature of the bitumen to always be at least 218 °C (425 °F) when it touches the membrane.

For safety reasons, the temperature of oxidized bitumen in a kettle or tank must never reach or exceed its flash point (approximately 293 °C [560 °F]). Consult the safety data sheet for more information.

To avoid product damage, **SOPRASPHALTE M** SEBS-modified bitumen must never be heated above 260 °C (500 °F). The product should be continuously mixed in the melter when it is heated.

2.2.2. Conditioning of Membranes

It is recommended to completely unroll the membrane 10 to 15 minutes before the installation, regardless of the temperature. This procedure releases the tension accumulated in the membrane during manufacturing and eases the application for the installer.

When the temperature is below 10 °C (50 °F), burn the plastic film of the upper face of the base sheet in a zigzag pattern (Figure 8).

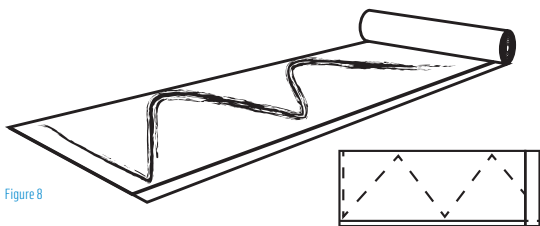


Figure 8

Below 0 °C (32 °F), when unrolling the membrane in the bitumen, heat the underface of the base sheet by directing the flame towards the back of the roll in a back-and-forth motion. Do not point the flame directly at hot bitumen (Figure 9).



Figure 9

2.2.3. Installation Methods

2.2.3.1. Field surface

The temperature of bitumen in the kettle or tanker must be controlled. Be especially careful to avoid a decrease in temperature while transporting the bitumen between the kettle and the application point.

The membrane must be immersed in a bed of hot bitumen at the rate of 1.0 to 1.5 kg/m² (20 to 25 lb/100 ft²).

At temperatures below 15 °C (60 °F), do not spread more than 1 m (3 ft) of bitumen in front of the roll in order to avoid premature cooling. At temperatures above 15 °C (60 °F), up to 3 m (9 ft) of bitumen in front of the roll is acceptable.

Do not push the roll; unroll it evenly and continuously in the hot bitumen.

OVERLAPPING OF BASE SHEET MEMBRANES

Oxidized bitumen

Apply a 25 to 50 mm (1 to 2 in) strip of hot bitumen on the side and end laps. The remainder of the laps must be sealed with a torch and trowel before the end of the workday.

SEBS-Modified Bitumen

Completely cover the overlaps with SEBS bitumen before unrolling the membranes.

OVERLAPPING OF CAP SHEET MEMBRANES

Oxidized bitumen

N/A (prohibited)

SEBS-Modified Bitumen

Completely cover the overlaps with SEBS-modified bitumen before unrolling the membranes.

It is not necessary to embed granules membranes at the end laps. However, special care must be taken in sealing the end laps using a membrane roller and propane torch (if not prohibited on the field) or hot-air gun.

Special Precautions When Using Mops

To avoid spontaneous fires, always squeeze out fibreglass mops and cover cotton mops to keep oxygen out. Remove them from the roof before leaving the worksite.

2.2.3.2. Flashings

Oxidized Bitumen

It is not recommended to use oxidized bitumen to apply membranes to flashings and parapets. The application of this type of bitumen on vertical surfaces may cause wrinkling and delamination of the membranes. If this method is still chosen, compensatory measures, such as the addition of round top nails, should be considered.

SEBS-Modified Bitumen

The use of a mop on flashings may result in the bitumen becoming too thick or creating streaks on the facade of the building. For the application of membranes on flashings, use rollers specifically designed for this purpose.

It is not necessary to embed granules membranes at the end laps. However, special care must be taken in sealing the end laps using a membrane roller with a propane torch or a hot-air gun.

2.3. SELF-ADHESIVE MEMBRANES

Self-adhesive membranes are ideal for projects where the use of the flame is not permitted or desired. This type of installation is well adapted to the particular needs of construction sites where safety is paramount, like schools and hospitals. These membranes are bonded in full adhesion or in semi-adhesion (**COLVENT**), with or without primer depending on the type of product and substrate.

Self-adhesive base sheet membranes can also be used in conjunction with heat-welded cap sheet membranes. This hybrid method optimizes fire safety on construction sites while offering the benefits of heat-welded membranes.

It is also possible to match sanded self-adhesive base sheet membranes with cap sheet membranes bonded with adhesive.

2.3.1. Limitations

Self-adhesive membranes are divided into specific grades of bitumen according to the installation temperature:

- Summer grade: $\geq 10\text{ }^{\circ}\text{C}$ ($50\text{ }^{\circ}\text{F}$)
- Low temperature (LT): $\geq 0\text{ }^{\circ}\text{C}$ ($32\text{ }^{\circ}\text{F}$)
- Winter grade: between $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$) and $10\text{ }^{\circ}\text{C}$ ($50\text{ }^{\circ}\text{F}$)

Winter grade self-adhesive base sheet membranes with a heat-welded surface have been designed to provide high performance at low temperatures, down to $-10\text{ }^{\circ}\text{C}$ ($14\text{ }^{\circ}\text{F}$).

Low temperature (LT) self-adhesive membranes with a sanded or granulated surface should be used at temperatures above $0\text{ }^{\circ}\text{C}$ ($32\text{ }^{\circ}\text{F}$) only.

When installing **COLVENT BASE 830** in winter conditions, it is advisable to install the cap sheet membranes on the same day as the base sheets.

The use of a primer-coated cover board is always required for self-adhesive base sheet membranes except for those two exceptions :

- **COLVENT BASE 840** can be directly installed over a previously primed **SOPRA-ISO PLUS** insulation panel.
- **COLVENT BASE 830** can be directly installed over a **SOPRA-ISO PLUS** insulation panel or a **SOPRA-ISO PLUS HD** support panel without primer.

In consideration of the previous points, a self-adhesive membrane cannot be directly installed on an insulating panel or on a support made of rockwool or wood fibre.

Self-adhesive cap sheet membranes could be affected by poor ventilation when they are installed directly to a wooden deck with ventilated attic space. Since it is impossible to predict temperatures at which membranes will be exposed in these conditions, it is recommended to mechanically fasten the membranes. This can be done using 25 mm (1 in) round top nails

or **SOPREMA SCREWS AND PLATES** every 305 mm (12 in) at the end laps.

When a flameless roof system is required or desired, all welding—including that of the side and end lap joints—must be completed with an electric hot air welder and a membrane roller or a **SOPRAMATIC** hot air welder.

When the parapet exceeds 1065 mm (42 in) in height, a first row of fasteners must be installed and spaced at a maximum distance of 610 mm (24 in) o.c. Depending on the height of the parapet, an additional staggered row of fasteners must be installed every other 610 mm (24 in). It is not necessary to cover these fasteners with a reinforcing membrane.

If the parapet is not covered with a metal cap flashing, secure the top of the base sheet membrane with 25 mm (1 in) round top nails spaced 305 mm (12 in) on centre.

2.3.2. Conditioning of Membranes

It is recommended to completely unroll the membrane 10 to 15 minutes before the installation, regardless of the temperature. This procedure releases the tension accumulated in the membrane during manufacturing and eases the application for the installer.

When the temperature is below 10 °C (50 °F), burn the plastic film of the upper face of the base sheet in a zigzag pattern (Figure 8).

2.3.3. Installation Methods

2.3.3.1. Field surface

Cover the substrate surface with primer for self-adhesive membranes.

Install the membrane according to its type of silicone release film.

Simple silicone release films:

Peel off a corner of the silicone film to allow the membrane to adhere to the surface. Then remove the silicone paper at an angle of 45°. While one worker peels off the silicone paper from the underface of the membrane, the other should pull on its free end to prevent creating any wrinkles in the membrane.

Split-back silicone release films:

Fold one half of the roll lengthwise on the other half. Peel the film, fold the exposed half over the base sheet, first by the centre, then by the two ends (butterfly technique) and repeat for the second half. It is best to have at least two workers to perform this manoeuvre.

Apply pressure over the whole surface using a heavy membrane roller to ensure a complete and uniform adhesion.

Process for end laps of fully adhered base sheet membranes:

For membranes with sanded surface, when completing end lap, apply **ELASTOCOL STICK** primer over the last 150 mm (6 in) of the membrane before installing the next membrane.

For membranes with weldable surface, when completing end lap, burn the plastic film over the last 150 mm (6 in) of the membrane before installing the next membrane.

Process for end laps of semi-adhered base sheet membranes:

For membranes with sanded surface, align all end laps without offsetting them and cover them with a **SOPRALAP STICK** membrane centred on the joint. Pre-coat the surface to be covered with **ELASTOCOL STICK** primer.

For membranes with weldable surface, align all end laps without offsetting them and cover them with a **SOPRALAP** membrane centred on the joint.

Process for end laps of cap sheet membranes:

For the cap sheet membrane, apply cold adhesive on the first 100 to 125 mm (4 to 5 in) of the end laps and weld the last 25 to 50 mm (1 to 2 in) using a hot air welder.

Finish the application by welding the last 25 mm (1 in) of the **DUO SELVEDGE** side laps using a hot air welder.

The use of **SOPRAMATIC** automatic hot-air welder will increase the speed and quality of the welding.

2.3.3.2. Flashings

Cover the substrate with primer for self-adhesive membranes. Peel off the silicone release paper at a 45° angle so as not to create any wrinkles in the membrane.

Apply pressure as the protective film is peeled off using an aluminum applicator or a membrane roller to obtain full adhesion.

Apply adhesive on the first 100 to 125 mm (4 to 5 in) of the end laps with notched trowel.

Finish the application by welding the last 25 to 50 mm (1 to 2 in) of the end lap and the **DUO SELVEDGE** side laps.



Note: It is mandatory to use a membrane roller to optimize the adhesion of the membranes.

2.4. MECHANICALLY FASTENED MEMBRANES

Base sheet membranes are attached to the deck with mechanical fasteners, as this method increases the installation speed of the roof assembly and does not require support panels. These systems are used for large areas and where wind uplift resistance may be high.

2.4.1. Limitations

On a steel deck, mechanical fasteners must be installed on the upper part of the ribs so that the fastening line is perpendicular to the ribs.

Only **SOPREMA SCREWS AND PLATES** should be used to install membranes.

Mechanical fasteners should be installed on the insulation boards at the rate of four fasteners minimum for a 1.2 × 1.2 m (4 × 4 ft) board and six fasteners minimum for a 1.2 × 2.4 m (4 × 8 ft) board. More fasteners may be required depending on the results of the wind uplift resistance test.

2.4.2. Conditioning of Membranes

It is recommended to completely unroll the membrane 10 to 15 minutes before the installation, regardless of the temperature. This procedure releases the tension accumulated in the membrane during manufacturing and eases the application for the installer.

When the temperature is below 10 °C (50 °F), burn the plastic film of the upper face of the base sheet in a zigzag pattern (Figure 8).

2.4.3. Installation Methods

2.4.3.1. Field surfaces

Fasten the end of the membrane.

Pull firmly on the whole length of the roll and fasten the membrane along the side joint, starting from the free end and moving towards the fastened end.

Mechanical fasteners must be installed in the centre of the side lap of the membranes aligned with the marks drawn along the overlap and according to the specified fastening pattern.

When installed on insulated panels, apply sufficient pressure on the screws and plates while making sure not to change the levels of the membranes by screwing them in too deeply.

Weld the last part of the **DUO SELVEDGE** with a propane torch or a **SOPRAMATIC** electric hot air cart.

For membranes with sanded surface, align all end laps without offsetting them and cover them with a **SOPRALAP STICK** membrane centred on the joint. Pre-coat the surface to be covered with **ELASTOCOL STICK** primer.

For membranes with weldable surface, align all end laps without offsetting them and cover them with a **SOPRALAP** membrane centred on the joint.

2.4.4.2. Flashings

Installing mechanically-fastened flashing membranes is not allowed. Refer to the other installation methods provided in this guide.

2.5. MEMBRANES BONDED WITH COLD ADHESIVE

Membranes installed with adhesives are ideal for projects where the use of a flame is not permitted or desired. This type of installation is well adapted to the particular needs of construction sites where safety is paramount, like schools and hospitals.

SOPREMA offers three technologies of adhesive for membrane, each with their own particularities regarding handling, limitations, and application temperatures.

SOPREMA also offers adhesive-bonded membranes specifically designed for low temperature applications. These are easier to handle at temperature as low as -10 °C (14 °F).

2.5.1. Limitations

Except for **SOPRATAACK WINTER** and **SOPRATAACK FLASHING WINTER**, adhesives offered by SOPREMA should not be used at temperatures below 0 °C (32 °F).

SOPRATAACK WINTER and **SOPRATAACK FLASHING WINTER** adhesives can be installed at temperatures as low as -10 °C (14 °F). However, to ease the application, the adhesive must be kept at temperatures between 10 and 30 °C (50 and 86 °F) 12 hours before application.

When a flameless roof system is required or desired, all welding, including that of the side and end lap joints, must be completed with an electric hot air welder and membrane roller or a **SOPRAMATIC** hot air blower cart.

In order to prevent moisture on sanded surfaces, it is recommended to install the cap sheet membrane on the same day as the base sheet membrane. If same-day installation is impossible, saturate the sanded surface with **ELASTOCOL 500**. This will help the surface to dry when works resume.

The cold-applied adhesives that contain solvents can damage polystyrene insulation. SOPREMA therefore does not recommend using a system with membranes bonded with this type of adhesive if the roofing system includes polystyrene insulation. This includes protected membrane roofing systems.

The use of a solvent-based adhesive is not permitted to bond membranes over coated or uncoated rockwool insulation.

It is not recommended to use a cold-adhesive-bonded membrane for lightweight insulated concrete systems.

Cold adhesives should not be used to bond rubber mats.

2.5.2. Conditioning of Membranes

It is recommended to completely unroll the membrane 10 to 15 minutes before the installation, regardless of the temperature.

This procedure releases the tension accumulated in the membrane during manufacturing and eases the application for the installer.

For the application techniques, curing times and coverage rate of each adhesive, consult the respective technical data sheets.

2.5.3. Installation Methods

2.5.3.1. Field surfaces

Unroll the membrane dry on the support.

Re-roll and spread adhesive using a notched squeegee on the surface to be bonded. Note that the coverage rate may vary depending on the substrate condition.

Unroll the membrane on the adhesive and apply pressure over the whole surface using a heavy membrane roller to ensure complete and uniform adhesion.

Apply adhesive on the first 100 to 125 mm (4 to 5 in) of the end laps with a notched trowel.

Finish the application by welding the last 25 to 50 mm (1 to 2 in) of the end laps. Welding must also be done on all side laps.

The use of **SOPRAMATIC** automatic hot-air welder will increase the speed and quality of the sealing.

2.5.3.2. Flashings



Note: For flashing membranes, although it is possible to use two layers of membrane bonded with adhesive, SOPREMA recommends using a self-adhesive base sheet and cap sheet to facilitate the application of the membranes.

2.5.3.2.1. Method No. 1

Coat the surface of the substrate with adhesive using a notched trowel. Leave 25 to 50 mm (1 to 2 in) free of adhesive at end and side laps.

Lay the membrane on the adhesive.

Partially weld the bottom of the membrane to hold it in place.

Apply pressure over the entire surface with a membrane roller to obtain complete and uniform adhesion.

For the base sheet membrane only, if the substrate is plywood, secure the membrane at the top of the parapet with round top nails spaced every 305 mm (12 in) on centre. For other types of substrate, use an alternative fastening method.

Finish the application by welding the last 25 to 50 mm (1 to 2 in) of the end and side laps.

2.5.3.2.2. Method No. 2

Coat the underface of the membrane AND the surface of the substrate with adhesive using a notched trowel. Leave 25 to 50 mm (1 to 2 in) free of adhesive at transverse and longitudinal overlaps.

Wait 10 minutes, then lay the membrane on the substrate.

Partially weld the bottom of the membrane to hold it in place.

Once the membrane is placed on the adhesive, apply pressure over the entire surface with a roller to obtain complete and uniform adhesion.

Finish the application by welding the last 25 to 50 mm (1 to 2 in) of the end and side laps.

2.5.3.2.3. Method No. 3



Note: In order to prevent the membranes from peeling off at transitions, a two-piece installation of membranes is strongly recommended when the temperature is below 0 °C.

Coat the surface of the substrate with adhesive using a notched trowel.

All last 25 to 50 mm (1 to 2 in) of the end laps and side laps on base sheets, as well as cap sheet, must be free of adhesive so they can be welded following the first stages regarding the installation of the membrane.

Install the first piece of membrane on the adhesive. Make sure the top end lap of the membrane is aligned with the upper inside corner of the parapet.

Partially weld the bottom of the membrane to hold it in place and weld the last 25 to 50 mm (1 to 2 in) of membrane at the top of the parapet.

Install the second piece of membrane on the top of the parapet. The membrane must exceed at least 50 mm (2 in) on either side of the parapet.

Weld the first 50 mm (2 in) flap located on the inside of the parapet and stretch the membrane over the parapet to fix the other end using mechanical fasteners.

Apply adhesive on the surface of the base sheet using a notched trowel without covering the top of the parapet.

Install the cap sheet on the adhesive by planning to fold the membrane at least 50 mm (2 in) over the top of the parapet.

Partially weld the bottom of the membrane to hold it in place and weld the 25 to 50 mm (1 to 2 in) located on the top of the parapet and the 50 mm (2 in) on the horizontal.

Apply pressure throughout the entire on the full surface using a membrane roller to optimize the adhesion of the membranes.

Cover the top of the parapet with an adhered piece of cap sheet membrane or a metal cap flashing.

Refer to the appropriate detail on the SOPREMA website.

2.6. FACTORY-LAMINATED BASE SHEET BOARDS

Factory-laminated base sheet boards (2-in-1 and 3-in-1) allow the installer to quickly waterproof the roof, thus protecting the system components from the weather in a very short time.

In addition, since the membrane is already factory-laminated on the support panel, the boards can be installed without temperature limitation.

With the **DUO SELVEDGE** technology, sealing the first self-adhesive section of the joint helps to protect the components under the base sheet from flame. The rest of the selvedge surface is then safely welded with a torch, a hot-air welder, or using the **SOPRAMATIC**.

Another benefit of the factory-laminated boards is that offsetting end laps is not necessary. The use of the **SOPRALAP** cover strip greatly simplifies the installation of laminated boards.

2.6.1. Limitations

There is no temperature limit for the installation of factory-laminated base sheet boards. These can be installed effectively even in winter conditions.

When boards are mechanically fastened on a system with insulation, apply sufficient pressure on the screws and plates while making sure not to cause a level change of the membranes by screwing them in too deeply.

2.6.2. Conditioning of the Panels

All 2-in-1 and 3-in-1 panels must be stored on a flat surface and protected from UV rays and harsh weather.

Never install boards that show signs of moisture.

2.6.3. Installation Methods

2.6.3.1. Field surface

All panels must be perfectly aligned without any significant height difference between them.



Bonded with **DUOTACK** and **DUOTACK 365** adhesives

Adhere the base sheet boards with beads of adhesive applied according to the spacing specified in the wind uplift test reports, ensuring that the pattern chosen meets the required wind uplift resistance for the building.

Bonded using hot bitumen

Apply a layer of hot asphalt at a rate of 1.0 to 1.5 kg/m² (20 to 25 lb/ft²) over the entire surface of the insulation board corresponding to the surface of the base sheet boards to be laid.

Mechanically fastened

Laminated boards should be installed perpendicularly to the steel deck flutes.

Mechanical fasteners must be installed at the centre of the selvages of the membranes.

Only **SOPREMA SCREWS AND PLATES** should be used to fasten panels.

SOPREMA SCREWS AND PLATES must be installed as indicated in the wind uplift test reports.

Seal the **DUO SELVEDGE** side lap joints with a torch and round-nosed trowel or a hot-air welder and a membrane roller.

For membranes with sanded surface, align all end laps without offsetting them and cover them with a **SOPRALAP STICK** membrane centred on the joint. Pre-coat the surface to be covered with **ELASTOCOL STICK** primer.

For membranes with weldable surface, align all end laps without offsetting them and cover them with a **SOPRALAP** membrane centred on the joint.

2.6.3.2. Flashings

Mechanically fasten the composite panel with **SOPREMA SCREWS AND PLATES** or round top nails to the parapet substrate.

When the laminated board has a sanded surface:

Apply a coat of **ELASTOCOL STICK** primer on a 100 mm (4 in) width, centred on every angle changes. Install a 150 mm (6 in) self-adhesive reinforcement membrane centred on each angle change and weld the last 25 mm (1 in) on each side.

When the laminated board has a weldable surface:

Weld a 150 mm (6 in) reinforcement membrane centred on each angle change.

Continue with the installation of the cap sheet following the recommendations for the type of membrane used.

3.0. INSULATION INSTALLATION METHODS

3.0. INSULATION INSTALLATION METHODS

The insulation technologies offered by SOPREMA help maintain a comfortable temperature inside buildings while increasing their energy efficiency.

SOPREMA offers different types of roof insulation. The choice of insulation and its installation method is based on the characteristics and limitations of each.

Insulation panels made of polyisocyanurate foam and rock fibres are used in self-protected cap sheet membrane systems (conventional) and extruded polystyrene insulation boards are generally used in protected membrane roof systems (inverted).

Polyisocyanurate panels and extruded polystyrene panels are available with shiplap edges, allowing a single row of insulation to be installed without having to worry about offsetting panel joints. This also saves time on the site as the installation is completed faster.

3.1. GENERAL INFORMATION

Insulation boards are installed in staggered rows. If the installation of the insulation boards can't be completed the same day, the site organization must allow staggered installation to resume.

When upstands are insulated from the outside, use a cover panel before installing the membrane.

When the insulation boards are mechanically fastened, use screws and plates specially designed for insulation.

When the boards are bonded using Type II or III oxidized bitumen, the temperature should be 10 °C (50 °F) below the equiviscosity temperature (EVT¹), which is between 190 °C and 218 °C (375 °F and 425 °F) depending on the manufacturer.

3.2. STORAGE

The insulation boards are typically protected by a plastic film for handling and transportation. However, this film does not provide adequate protection for long-term storage on a worksite.

To limit the storage period on site, schedule delivery a little before the board installation date.

Follow these precautions when on-site storage is required (on the ground or the roof):

- Store pallets flat on a finished surface (gravel, pavement, concrete, etc.) rather than on a surface that can remain wet (grass, soil, etc.), and ensure they are elevated by at least 75 mm (3 in).
- Cover the pallets with waterproof tarps and shelter them from the wind.

1. Equiviscosity temperature (EVT): The temperature at which bitumen reaches an ideal viscosity threshold (125 cP [0,125 Pa•s]) which guarantees a sufficient quantity of asphalt used between the membrane layers (www.roofingcanada.com).

3.3. POLYISOCYANURATE BOARDS



Polyisocyanurate boards are offered with organic facers reinforced with glass fibers or with polymers coated glass fibers facers.

3.3.1 Limitations

Polyisocyanurate boards of 1.2 m × 2.4 m (4 ft × 8 ft) must not be bonded with hot bitumen or adhesive.

Where a base sheet is mechanically fastened, mechanical fasteners must be installed on the insulation board using a minimum of four fasteners for each 1.2 m × 1.2 m (4 ft × 4 ft) panel and six fasteners for each 1.2 m × 2.4 m (4 ft × 8 ft) panel. More fasteners may be required depending on the wind-resistance test results*.

*For more details about the number of mechanical fasteners needed, consult the Wind Uplift Resistance Testing reports according to CSA A123.21 standard or publications according to FM 4470 Standard (RoofNav Database), including recommendations for corners and perimeters listed in PLPDS 1-29 from Factory Mutual.

3.3.2. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with hot bitumen.
- Bonded with **DUOTACK** or **DUOTACK 365** adhesives.

3.4. ROCKWOOL BOARDS



Rockwool boards are available with or without bitumen-coated surface. The bitumen layer is used to install membranes using hot bitumen or adhesive, or to weld them directly onto the insulation boards.

3.4.1. Limitations

Self-adhesive membranes must not be installed on this type of board, whether they have a bitumen-coated surface or not.

No adhesive, including hot bitumen, can be applied to the surface of an uncoated rock wool panel.

When an uncoated rockwool panel is mechanically fastened, at least one of the elements installed on it must also be mechanically fixed.

The only way to install an element on an uncoated rockwool panel is to mechanically attach it. As a result, the rockwool panel is fastened at the same time.

3.4.2. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with hot bitumen.
- Bonded with **DUOTACK** or **DUOTACK 365** adhesives.
- Loose laid.

3.5. EXTRUDED POLYSTYRENE BOARDS



3.5.1. Limitations

Extruded polystyrene boards must be covered with a polyisocyanurate or mineral fibres (rockwool) board of a minimum thickness of 50 mm (2 in). This rule does not apply to the use of extruded polystyrene on an inverted roof system.

The use of materials bonded with hot bitumen is not recommended in a waterproofing system using extruded polystyrene insulation boards. These materials include insulation boards, support panels and base sheet membranes.

The cold-applied adhesives that contain solvents can damage polystyrene insulation. SOPREMA therefore does not recommend using a system with membranes bonded with this type of adhesive if the roofing system includes polystyrene insulation. This includes protected membrane roofing systems.

Do not install extruded polystyrene boards if they can't be covered the same day.

3.5.2. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with **DUOTACK** or **DUOTACK 365** adhesives.
- Loose laid

When a polystyrene board is used on a protected membranes roof, it is installed loose laid on the roof. The ballast placed on the roof keeps the boards in place. Install a filter cloth or an open-diffusion drainage board over the polystyrene panels.

4.0. SUPPORT PANELS INSTALLATION METHODS

4.0. SUPPORT PANELS INSTALLATION METHODS

Support panels are used in most roofing systems with bonded membranes. They provide additional stability to the roof system as well as better resistance to fire, hail, wind, mildew, and compression depending on the type of panel. It is therefore important to choose the right support panel according to the needs and requirements of the project.

4.1. Limitations

Support panels must be quickly covered after their installation and can't be left exposed to the weather.

The **ELASTOCOL STICK H₂O** primer should not be used on asphaltic boards.

Except for the **SOPRASMART ISO HD**, do not bond high-density polyisocyanurate panels with hot bitumen.

Support panels are installed in staggered rows. If the panel installation can't be completed the same day, the site organization must allow staggered installation to resume.

4.2. Storage

Some support panels are protected by a plastic film for handling and transportation. However, this film does not provide adequate protection for long-term storage on a worksite.

To limit the storage period on site, schedule delivery a little before the installation date of the support panels.

Respect the following precautions when on-site storage is required (on the ground or the roof):

- Store pallets flat on a finished surface (gravel, pavement, concrete, etc.) rather than on a surface that can remain wet (grass, soil, etc.), and ensure they are elevated by at least 75 mm (3 in).
- Cover the pallets with waterproof tarps and shelter them from the wind.

4.3. Asphaltic Panels

4.3.1. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with hot bitumen (minimum application temperature of 220 °C [425 °F]).
- Bonded with **DUOTACK** or **DUOTACK 365** adhesives.

4.4. High Density Polyisocyanurate Boards

4.4.1. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with DUOTACK or DUOTACK 365 adhesives.

4.5. WOOD FIBRE

4.5.1. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with hot bitumen (minimum application temperature of 220 °C [425 °F]).
- Bonded with DUOTACK or DUOTACK 365 adhesives.

4.6. PERLITE

4.6.1. Installation Methods

- Mechanically fastened with screws and plates designed for insulation.
- Bonded with hot bitumen (minimum application temperature of 220 °C [425 °F]).

5.0. INSTALLATION METHODS FOR ACCESSORIES

5.0. INSTALLATION METHODS FOR ACCESSORIES

5.1. Pitch pockets (SOPRAMASTIC BLOCK)

SOPRAMASTIC BLOCK is a prefabricated pitch pocket system that helps to easily incorporate waterproof roofing details in places where penetrations present technical challenges.

- The SOPRAMASTIC BLOCK system is composed of the three following products:
- **SOPRAMASTIC BLOCK:** Precast blocks made of polyester resin.
- **SOPRAMASTIC PF:** Self-levelling sealant made of polyether resin.
- **SOPRAMASTIC SP2:** Sealing mastic and adhesive made of polyether resin.

5.1.1. Limitations

Minimum application temperature: 0 °C (32 °F).

The system service temperature is between -40 °C and 93 °C (-40 °F and 200 °F), but it should not be exposed to temperatures higher than 60 °C (140 °F) for extended periods.

5.1.2. Installation Method

The SOPRAMASTIC BLOCK system can be installed on the following substrates:

- SBS-modified bitumen granulated membrane;
- SBS-modified bitumen membrane with a sanded surface;

Make sure all surfaces are clean, dry, and free from debris, dust, loose particles, oil, corrosion, rust, condensation, or other contaminants.

Clean all metal surfaces and PVC pipes with non-greasy solvents such as acetone or methyl ethyl ketone (MEK).

Place the precast blocks at the desired location and trace around their shape on the roof for reference. Precast blocks must be placed so as to leave a minimum gap of 25 mm (1 in) between their inner perimeter and the penetration.

Using a standard cartridge extruder, apply **SOPRAMASTIC SP2** at the base of each penetration and spread the product up to 25 mm (1 in) above the height of the precast blocks.

Apply a bead of 1/4 in (6 mm) of **SOPRAMASTIC SP2** on the perimeter and in the centre of the flat surfaces of the precast blocks (i.e., under the blocks and at their ends).

Place and align the blocks on the outline traced on the roof.

Apply pressure on the precast blocks until product overflows from all sides. This will prevent water from seeping between the granules and blocks.

Apply a bead of **SOPRAMASTIC SP2** at the block joints and at the outer perimeters of the structure formed by the precast blocks.

Use the tip of a trowel to correctly adhere the **SOPRAMASTIC SP2** to the membrane.

Completely fill the configuration with **SOPRAMASTIC PF***.

SOPRAMASTIC PF is dry to the touch after 20 minutes, but the full curing period may vary depending on the temperature and humidity.

5.2. Liquid Membranes (ALSAN FLASHING)

ALSAN FLASHING is a ready-to-use single-component sealant made of bitumen and polyurethane for the creation of flashings and other details where it is difficult to apply sheets of waterproofing membranes.

ALSAN FLASHING can be applied without primer on modified bitumen membranes with a sanded or granulated surface, wood, metal, prepainted metals, concrete, and PVC pipes (vertical partition walls only).

5.2.1 Limitations

Do not apply at temperatures below 5 °C (41 °F).

Do not use if rain or snow is forecast within 12 hours after the installation.

It is recommended to use **ELASTOCOL 500** primer when applied to B.U.R. roofs.

5.2.2. Application Method

Surfaces must be clean, dry, and free of debris, dust and traces of formwork or curing products, irregularities, laitance, etc.

Sand PVC pipes with sandpaper.

Clean all metal surfaces with non-greasy solvents such as acetone or methyl ethyl ketone (MEK).

Metals must be smooth, clean, and free of contaminants.

Mix the product well before use.

ALSAN FLASHING is applied using a trowel, a roller or a brush in two layers (minimum) and in three layers if **FLASHING REINFORCEMENT** is required.

Transitions, changes in plane, and junctions between two supports must be reinforced with **FLASHING REINFORCEMENT**.

Using a trowel lay the **FLASHING REINFORCEMENT** in the first layer of **ALSAN FLASHING**. It should be covered immediately with another layer of **ALSAN FLASHING** until saturation. The third layer of **ALSAN FLASHING** is applied when the second is dry on the surface and no longer sticky to the touch (2 to 3 hours).

ALSAN FLASHING does not require protection against ultraviolet (UV) radiation, but for aesthetic reasons, the surface may be covered with mineral granules. If this is the case, once the third coat is applied, cover it with mineral granules before the curing period is completed.

*For the installation of the **SOPRAMASTICK BLOCK** system vertically, completely fill the precast block with **SOPRAMASTIC SP2**.

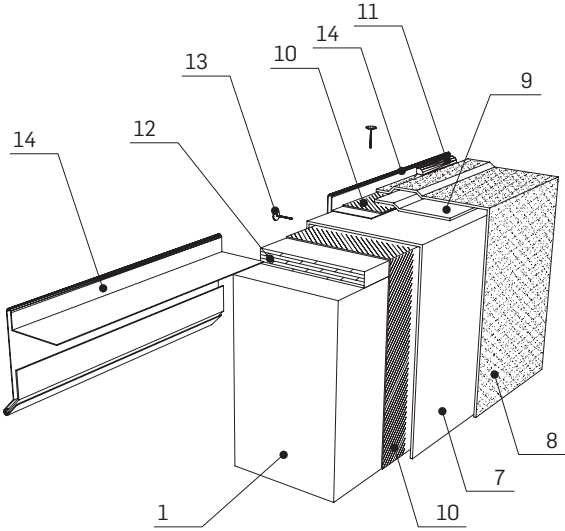
6.0. DETAILS

6.0. DÉTAILS

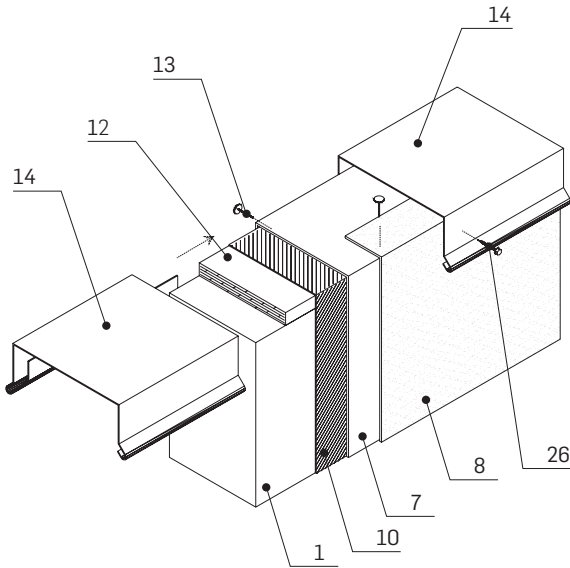
6.1. Legend

1. Support
2. Vapour barrier
3. Insulation
4. Support panel for membrane
5. Base sheet on field surface
6. Cap sheet on field surface
7. Base sheet for upstands
8. Cap sheet for upstands
9. Reinforcement membrane
10. Primer or adhesive
11. UV resistant sealant
12. Wood blocking
13. Round top cap nails
14. Metal flashing
15. Cant strip
16. Drain
17. Flange
18. Vent pipe
19. Basket strainer
20. Vent cap
21. **SOPREMA DRAIN EP**
22. **SOPREMA BASKET STRAINER**
23. Optional fire stop where required (torched-on membranes only)
24. Lead plug
25. Scupper flashing
26. Nylon head fastener
27. B.U.R. + gravel
28. **SOPRAMASTIC PF**
29. **SOPRAMASTIC BLOCK**
30. **SOPRAMASTIC SP2**

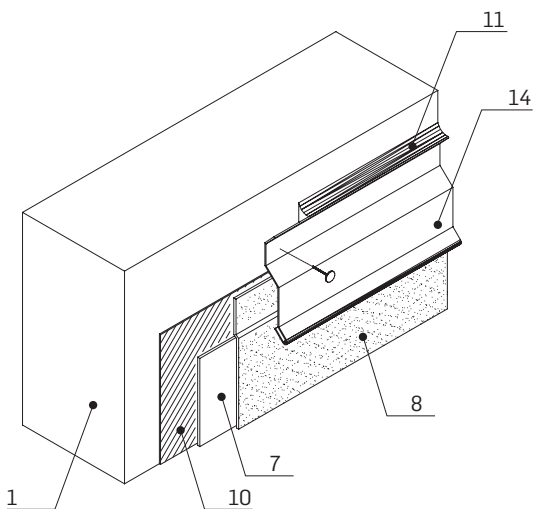
6.1.1. METAL FASCIA PARAPET TERMINATION



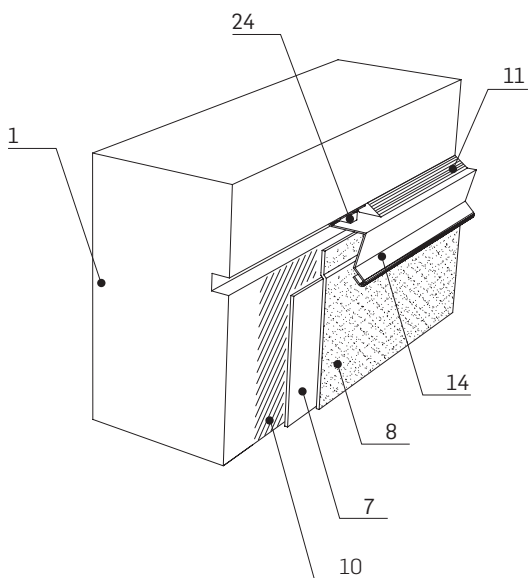
6.1.2. METAL CAP PARAPET TERMINATION



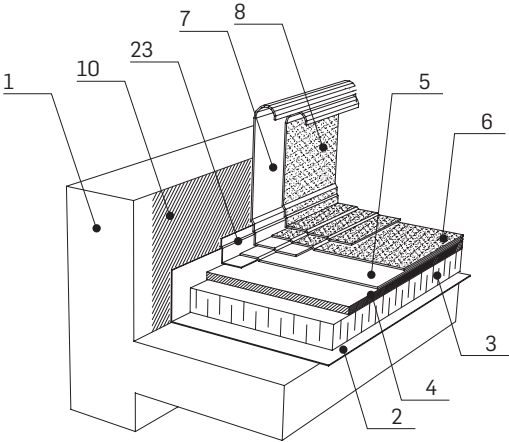
6.1.3. METAL COUNTERFLASHING TERMINATION



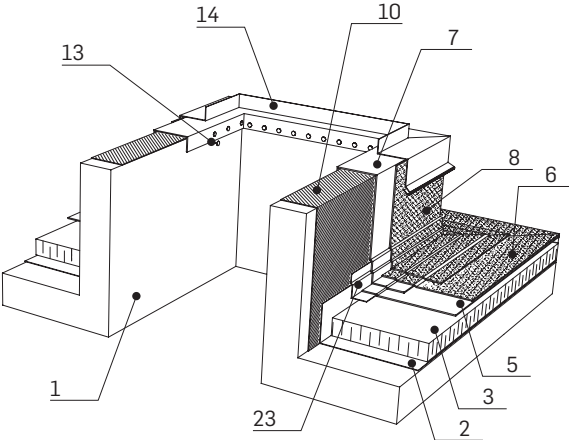
6.1.4. REGLET COUNTERFLASHING TERMINATION



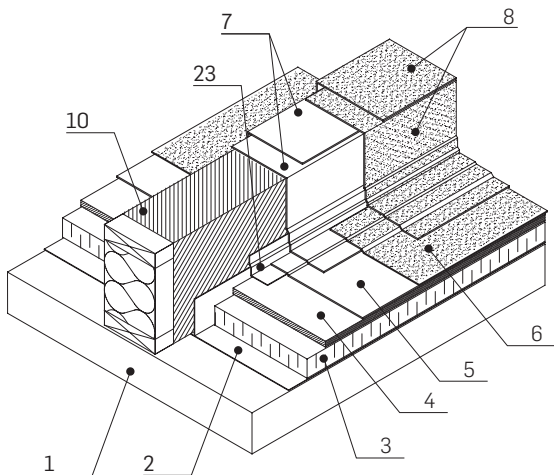
6.1.5. MEMBRANE AT WALL FLASHING



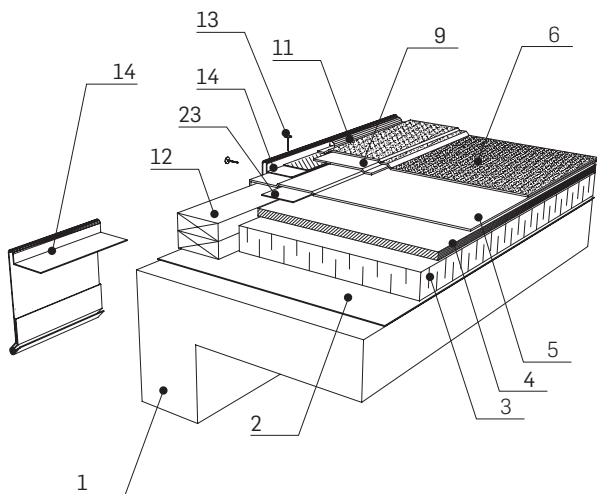
6.1.6. MECHANICAL CURB FLASHING



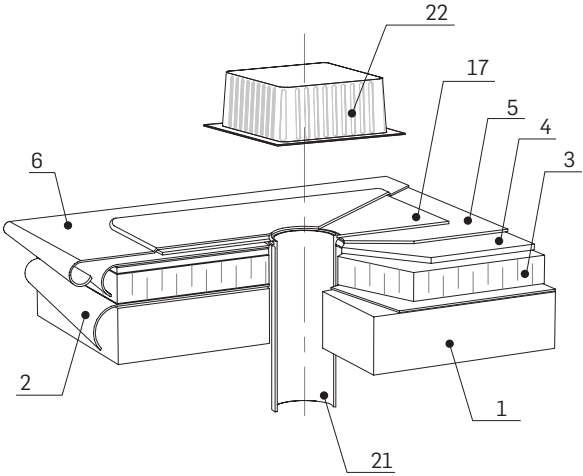
6.1.7. ROOF AREA DIVIDER - UPSTANDS



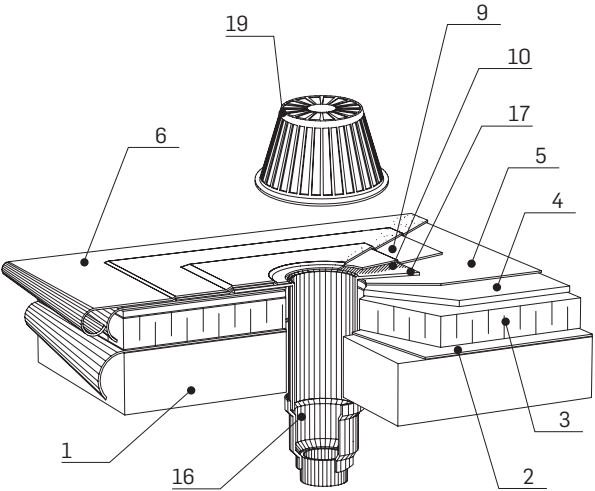
6.1.8. METAL FASCIA EDGE TERMINATION



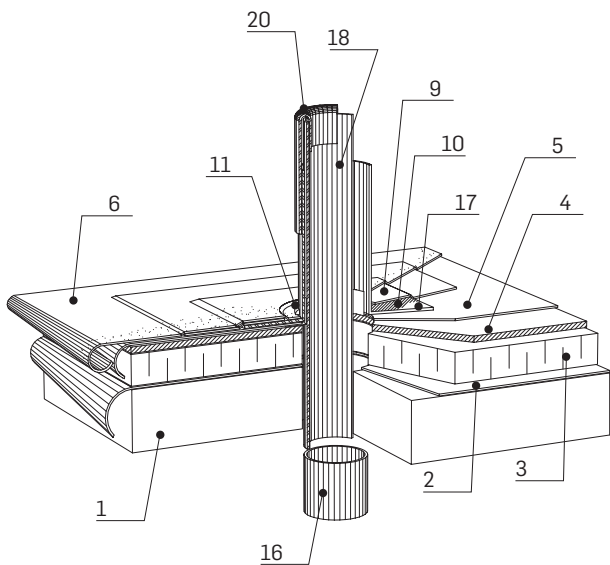
6.1.9. ROOF DRAIN TERMINATION SOPREMA DRAIN EP



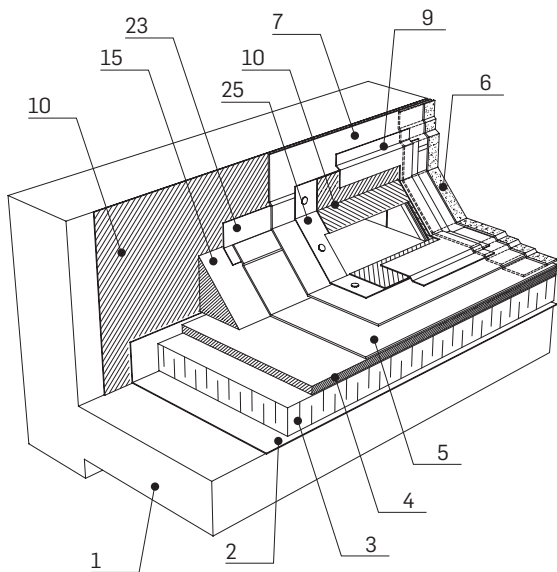
6.1.10. ROOF DRAIN TERMINATION



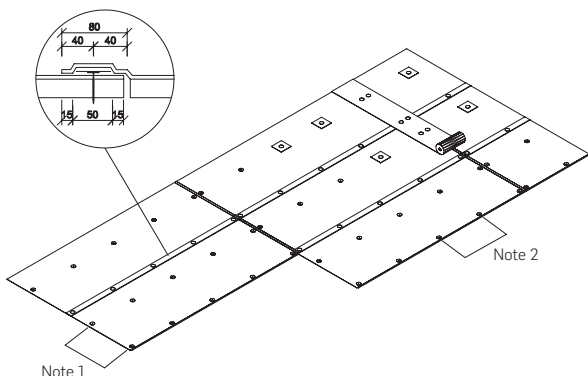
6.1.11. PREFABRICATED VENT SLEEVE FLASHING



6.1.12. SCUPPER AT DECK METAL SLEEVE



6.1.13. FASTENING PATTERN



Note 1: Space between each row of fasteners is 610 mm (24 in) (2 rows per board).

Note 2: Fastener density on each roof area (field surface, perimeter and corners) must be chosen as per the wind loads determined using the National Research Council of Canada (NRCC) online calculator (WIND RCI).

SAFETY FACTOR

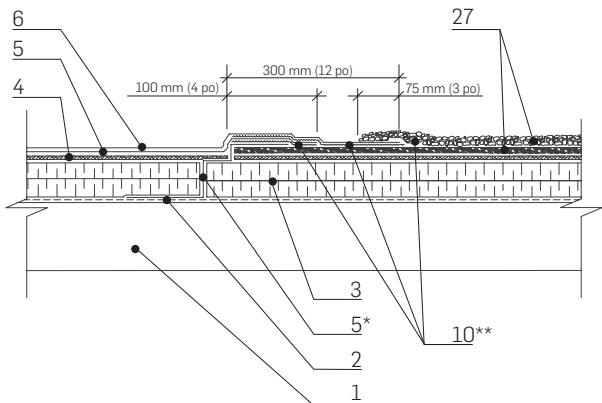
As required by the standard, the published Dynamic Uplift Resistance (DUR) are reduced by a safety factor of 1.5.

These fastening patterns have been determined as per the CSA 123.21-10 standard. Those results are valid only if you use approved membranes, fasteners and other components for this system. For more information regarding the system components, consult the roof system assessment report of Wind Uplift Resistance published by an authorized laboratory.

6.1.14. JUNCTION MODIFIED BITUMEN SYSTEM AND EXISTING BUR

Cold Applied

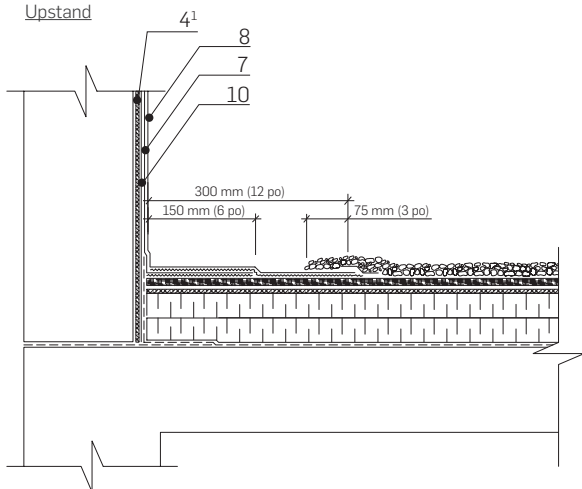
Field surface



* Partitioning joint

** Adhesive for SBS modified elastomeric membrane

Upstand



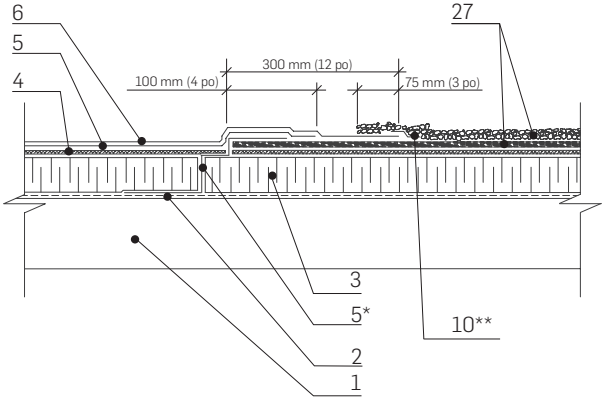
Note: Scarify and apply ELASTOCOL 500 primer on B.U.R. surface in overlap area prior to installation of modified bitumen membranes.

Note 1: SOPRABOARD must be mechanically fastened before the installation of new base flashing membranes over existing.

6.1.15. JUNCTION MODIFIED BITUMEN SYSTEM AND EXISTING BUR

Heat-welded

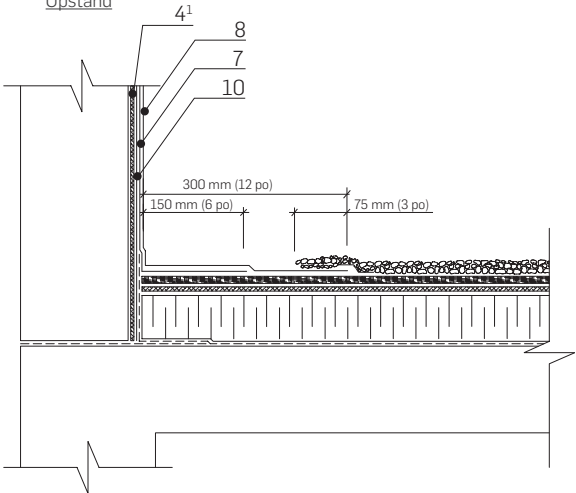
Field Surface



* Partitioning joint

** Adhesive for SBS modified elastomeric membrane

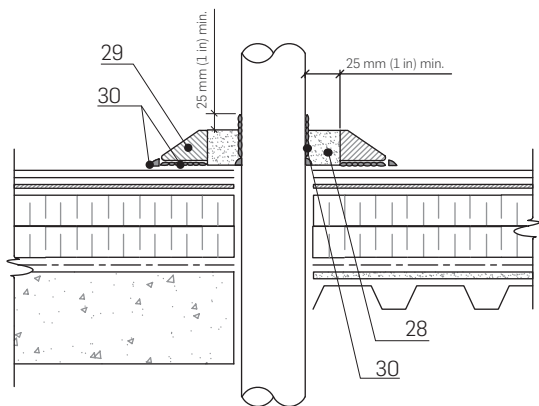
Upstand



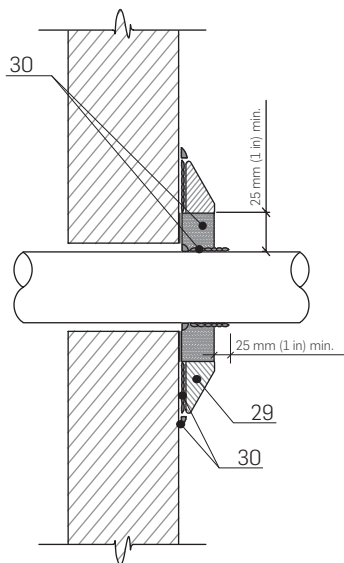
Note: Scarify and apply ELASTOCOL 500 primer on B.U.R. surface in overlap area prior to installation of modified bitumen membranes.

Note 1: SOPRABOARD must be mechanically fastened before the installation of new base flashing membranes over existing.

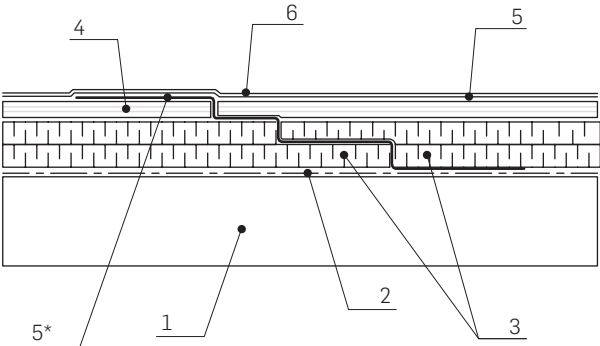
6.1.16. SOPRAMASTIC BLOCK SYSTEM - HORIZONTAL



6.1.17. SOPRAMASTIC BLOCK SYSTEM - VERTICAL



6.1.18. PARTITIONING JOINT



*Self-adhered Membrane

INNOVATION SINCE 1908

SOPREMA has developed around the idea that the quality, durability and reliability of materials must match builders' ambitions and expectations. For more than 100 years, SOPREMA has been using its expertise to develop a variety of high-end products that meet or exceed all the requirements of the construction field.

ROOFS WALLS FOUNDATIONS PARKING DECKS BRIDGES ADDITIONAL EXPERTISE



WATERPROOFING



INSULATION



VEGETATIVE
SOLUTIONS



SOUNDPROOFING



ACCESSORY
PRODUCTS

SOPREMA is an international manufacturer specializing in the production of waterproofing and insulation products, as well as vegetative and soundproofing solutions, for the building and civil engineering sectors.

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