RubberShell

Installation Manual

RUBBERSHELL
GUTTERS

SBS BITUMEN

A PRODUCT BY SEALECO

ROOFING

Installation Manual

RubberShell Gutters

Preface

The information in this manual is a guideline to provide sound waterproofing. The base for the guideline is many years of practical and design experience obtained by SealEco. Local legislation or design practice may differ slightly from these specifications and instructions, however the information enclosed should be considered as a general guideline towards the most effective product use and application in a given situation when installing our membranes. Since the handling and installation is beyond our control, SealEco retains no responsibility for these areas. We make every effort to ensure that the information provided in this document is current and accurate. However, errors, misprints, inaccuracies, omissions or other errors may sometimes occur despite our best efforts. SealEco does not warrant that the content of this document including, without limitation, product-/installation descriptions or photographs and illustrations, is accurate or complete. RubberShell can only be installed after a successful training course. Please contact your local RubberShell supplier.

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1 General instructions

Membrane
RubberShell SA 1.6 mm can be used as a waterproofing for gutters. The following instructions are only applicable for external gutters and not for roof details, such as roof valleys.

Substrate
RubberShell can be used on all common substrates such as: concrete, metal, insulation or wood. RubberShell must never be installed onto moist substrate. Do not allow any condensation in your substrate. All type of moisture shall finally result in blisters or folds.
The substrate should have adequate strength and rigidity to carry actual loads from wind, snow, ballast, etc. We recommend a minimum slope of at least 1%. Ponding water is not allowed.
The substrate should be relatively even - equivalent to wood floated concrete. It should be clean and free from water in any form as well as contaminations such as oil or grease. Note also that foaming agents present in cellular concrete might influence ageing properties of the RubberShell membrane. Screws or nails must be properly entered into substrate without risking coming out.
The smoothness of the substrate is especially important under splice areas. Difference in levels of more than 5 mm must be levelled before splicing.

Primer 9800
Primer 9800 shall always be fully applied to the substrate prior to the installation of RubberShell SA 1.6 mm.
It is available in different packaging. When a pressurized canister is being used, SealEco recommends a training course for using the primer and its accessories.
When using primer in cans, it is important to stir the primer mechanically before use. Apply Primer 9800 to the substrate using a fleece roller or brush and make sure to cover the whole substrate. Close the can immediately after use because the solvents will evaporate if exposed to the air.
After applying the primer onto the substrate, let it flash off before adhering the membrane. (Approximately 20 minutes - 20 C° and 50% RH.)
In cases where the work has been interrupted for a longer period of time (>3 h), a second layer of Primer 9800 has to be applied.
Store the primer in temperatures between +5 C° and + 25 C°. Shelf life: 12 months if stored cool in unopened original packing.

Primer 9800 is not suitable as a primer for Polystyrene foam and plasticized PVC foil.
Primer 9800 is highly flammable. Read the MSDS before use.

The average consumption is between 175 and 250 g/m², depending on the substrate.

Table 1: Primer 9800 - Substrates
Substrates and average consumption of Primer 9800. Always check with the producer of the insulation whether adhesion to the substrate is suitable.

Substrate	Remark	Average consumption (g/m²)
Plywood	Water resistant	175
OSB	Pts 3	200
Concrete, vibrated	Smooth surface	200
Concrete, cellular	Apply Primer 9800 twice	200 + 175
Screed	Only when acceptable quality	225
Sanded bitumen	Clean the surface.	200
APP	Clean the surface.	175 - 200
SBS bitumen	All loose particles to be removed. Clean the surface.	200 - 250
Oxidized bitumen	Minimum 110/30 to be used.	200
PIR laminated with aluminium	Not allowed	-
PIR laminated with multi-layer gas-tight aluminium construction	Not recommended	175
PIR laminated with bitumen	Clean the surface.	175
PIR laminated with mineral glass fleece	-	200
Foamglass - Perlite - Mineral wool	Bituminous layer necessary (min. V3)	200
Zinc	Surface completely covered by the membrane. No contact with water allowed.	175
Galvanized metal, Stainless steel, Aluminium, Copper	Clean and degrease surface carefully. Surface must be completely covered and unexposed to water. Plastisol and teflon coated metal plates not allowed.	175

2 List of materials

All Technical Data Sheets and Safety Data Sheets can be consulted on our documentation app on www.SealEco.com. Availability depending on country. Contact your local supplier for more information.

2.1 RubberShell SA 1.6 mm

RubberShell SA 1.6 mm is developed for making facades, gutters and foundations watertight. It is a multifaceted and reinforced rubber membrane for building envelopes. It is foreseen with a self-adhesive layer which is protected by a removable PE-foil. Rubbershell is highly UV resistant and has a guaranteed function and integrity in all climates. The bitumen layer of the product enables an instant, visually verifiable result of lap sealing due to material bleed. The products contain no dangerous chemicals such as chlorine or plasticisers.

2.2 Adhesives - Cleaner - Sealant

Cleaning Wash 9700 is a technical petrol used for cleaning weathered rubber membranes before installation and repair.
Coverage: 5 - 20m² depending on the substrate

Primer 9800 is a polymer based primer for consequent use with self-adhesive SealEco rubber membranes, and for priming porous substrates.
Coverage: 125-250g/m² depending on substrate

Sealant 5590 is a neutral, elastic one-component joint sealant based on silicones. It has excellent adhesion to SealEco rubber and most substrates. The sealant is used for sealing against substrates.

Coverage: 6 lm/cartridge - 12 lm/sausage

2.3 RubberShell accessories

The **RubberShell PE Roof Drain** is equipped with a 400 x 400 mm collar of RubberShell flange that makes it heat spliceable to the membrane. The drain can be used horizontally as overflow. The pipe is made of HDPE. The pipe length is 500 mm.

The **RubberShell PC Roof Drain** is equipped with a 500 x 500 mm collar of Rubbershell flange that makes it heat spliceable to the membrane. The pipe is made of Stainless Steel. The pipe length is 500 mm.

2.4 Tools, machines and other accessories

Grinding Machine Flex for refreshing oxidised rubber surface before splicing. The machine is delivered with adaptation rings to fit the width of the grinding disc.

A **Welding Handgun** is used for heatsplicing of membranes and details.

Leister	**Sievert**	**Steinel**	**Nozzle**
1600 W	2000 W	1750 W	40 mm

Accessories

Silicone pressure roller 40 mm	Silicone pressure roller 80 mm	Silicone pressure roller Leister 40 mm	PTFE roller Leister 28 mm
			
Brass detail roller	**Brass detail roller Leister**	**Reinforced EPDM scissors**	**Alu wall profile**
			

ⓘ Availability depending on country. Contact your local supplier for more information.

3 Work preparation - Quality assurance and control

3.1 Preparation of the workspace

The basis of an efficient and safe gutter installation is preparation and careful planning of the work. Make sure to read the corresponding Material Safety Data Sheets (MSDS) which can be found on our website. Ensure to have the necessary tools/accessories available prior to beginning installation:

- RubberShell SA 1,6 mm - RubberShell Drain
- Primer 9800 - Cleaning Wash 9700 - Sealant 5590
- Scissors - Utility knife - Silicone pressure roller - Brass detail roller
- Hot air welding handgun
- Brush - Roller - Spraying set for primer
- Caulking gun - Measuring equipment - Chalk line - Broom - Standing up pressure roller - Screwdriver - Rags

3.2 Materials handling and storing

Check upon delivery that the materials match the order acknowledgement, shipping documents and product labels. Missing or damaged goods should be reported immediately. Store all materials according to the product specifications. Never store the product in direct sunlight. All rolls must be stored and transported in a vertical position (except versions in width 1200 mm and wider). Do not store pallets on top of each other. Packages should not be opened until the material shall be applied. If the installation work is interrupted, unprotected rolls should be covered or put back in their packaging. The shelflife of RubberShell EPDM is 12 months.
Make sure that the substrate can carry the load when material is placed on the roof or gutter (point load).
Keep the work site in good order and free from construction debris, loose nails, metal pieces, etc.

3.3 Climate Conditions

When applying Primer 9800 or adhering RubberShell the minimum temperature is +5°C. In case of precipitation, mist or risk of condensation, all works will be stopped immediately.
RubberShell cannot be installed using a torch.
Make sure that no moisture can be trapped in between the substrate and the RubberShell membrane. Any kind of moisture will have a negative impact on the adhesion to the substrate and will effect hot air splicing due to formation of vapour and steam.

3.4 Oxidisation

When RubberShell is exposed to the sun for a longer period the surface oxidises. This does not affect the properties of the membrane itself but it will have an impact on the quality and strength of the RubberShell splice. We therefore recommend careful planning so that all splicing is done as soon as possible after RubberShell is rolled out and fixed to the substrate. Another alternative is to cover the seam areas or to fold back the membrane to protect them, until splicing can be fulfilled according to the instructions. If the RubberShell has oxidized the splice areas must be grinded with a grinding machine and nylon grinding disc followed by cleaning before seaming. The time it takes for oxidisation to occur, is depending on the strength of the sun. Therefore it is of particular importance to perform a splice test before starting regular splicing.

3.5 Quality assurance and control

Quality control and assurance are essential elements in the installation of RubberShell system.
As the quality of the waterproofing is highly dependent upon the workmanship of the installer only contractors that are trained and certified by SealEco are allowed to do installations.

Documentation
Each installation should be carefully documented and include data on the installed membrane.

Visual control
Visual controls of the work and the quality should be carried out throughout the membrane installation.
Problems and faults should be detected and fixed as early as possible. Controlling aspects should be:

- That the correct materials are being used and installed with the correct equipment, and ensuring proper on-site storage.
- That the materials are installed according to the guidelines of SealEco, local regulations and in accordance with good workmanship practice.
- That the material is not at risk of mechanical damage.

4 Refurbishment requirements

Before initiating a refurbishment of a gutter an investigation should be performed. This should include finding the reason for the refurbishment and if some circumstances have led to a shorter life span of the waterproofing than expected.
It is also important to evaluate which components of the gutter can be reused and which need to be changed.
When connecting to an existing membrane other than RubberShell, a curb detail should be constructed. Both the RubberShell and the other membrane should be terminated at the top of the curb and be covered by suitable coping.

EPDM
No specific action needs to be taken. Only inspection and treatment of troubled areas needs to be attended to, such as; sharp edges from metal details, nails and screws not properly entered into substrate etc. It is not possible to adhere a RubberShell as refurbishment to an old EPDM membrane. We only guarantee connections to another RubberShell membrane. All instructions need to be followed.

Bitumen
Old bitumen felt roofs must be swept clean, sealed and levelled. Stones and sharp objects should be removed i.e. with a steel scraper. Wrinkles, blisters, waves and loose felt should be cut off and repaired. All differences in height under RubberShell seam areas should be levelled to be smooth.

Zinc, aluminium, stainless steel, copper
Clean and degrease the surface carefully.
The surface has to be completely covered by the membrane. Contact with water is to be avoided. Plastisol and teflon coated surfaces are not compatible.

5 Splicing

For the onsite seaming during the installation, the hot air seaming technique is applied. A handheld welding tool in combination with silicone or brass pressure roll is used for splicing and detail work.

5.1 General instructions

5.1.1. Environment

Heat splicing can be made in ambient temperature in the range +5°C to +30°C. In case of precipitation all splicing will be stopped immediately. Be sure that no moisture is enclosed beneath the membrane. This will have a huge impact on the strength of the splices.
Temperature and speed settings need to be adapted along atmospheric circumstances.

5.1.2. Membrane

The splice areas of the membrane must be dry, smooth, clean and free from wrinkles. If not dry and clean, rinse the membrane with Cleaning Wash 9700. Don't use other products for cleaning, because they might interfere with the splicing techniques or be incompatible with RubberShell.
Folds in splicing are not permitted. Never make splices when the membrane is stretched. All tension should be removed.
It is of great importance that both areas that should be seamed together are properly heated before the contact areas are joined.
Welding should be done in one direction. In case of welding in different directions, stresses will be introduced and proper patching will be needed.
Visible corners in the top layer shall be rounded to a radius of approximately 30 mm.
All membranes installed should be spliced the same day.

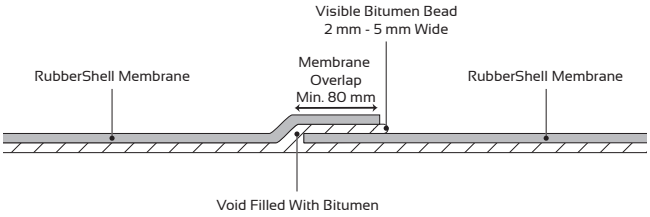
5.1.3. Oxidisation

As the RubberTop Fleece is exposed to sun and weather conditions, the surface oxidises. This does not change the properties of the membrane but the quality and strength of the splice is strongly affected. See chapter 3.4 for more information about oxidisation.

5.2 Splice width

The minimum splice width and overlap is 80 mm.
At all times, a clearly visible bitumen bleed, minimum 2 mm to maximum 5 mm wide, is extruded from the edge of the membrane. This enables a simple visual inspection to confirm that the overlap is welded. If the bitumen bleed does not comply to previous instructions, a new piece of RubberShell has to be installed on top.

Figure 1



If welding is interrupted, the welding process must be recommenced from the precise position where the previous weld was terminated. Make sure a proper connection can be made. If this is not possible, apply a RubberShell patch.

5.3 Welding tools

5.3.1. Machinery settings

Table 2: Temperature and speed settings for Hot Air Welding

Machine	Application	Settings
Handwelder	Detail work: corners, drains, repairs.	Temperature: 450 - 620°C Speed and pressure: To be adapted Nozzle: 40 mm Airflow: 60% - 100%
At all times a test splice should be performed prior to installation. Contact SealEco's Technical Department for more information on settings for different brands and types.		

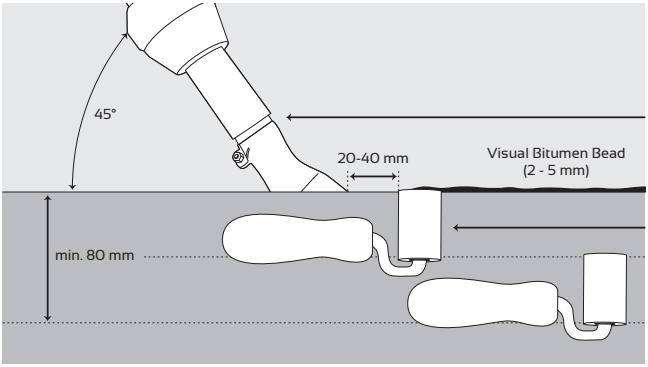
5.3.2. Machinery handling - in general

Check if the machinery, nozzle and pressure rollers are free from previous leftover bitumen. Clean the nozzle with a steel brush and the pressure rollers with Cleaning Wash 9700. While welding, be careful not to move the pressure roller directly over the seam edge. When bitumen sticks on the pressure roller during splicing, immediately stop and clean the roller before proceeding!
Make sure that the electric current is stable and sufficient.

5.3.3. Handheld welding tool

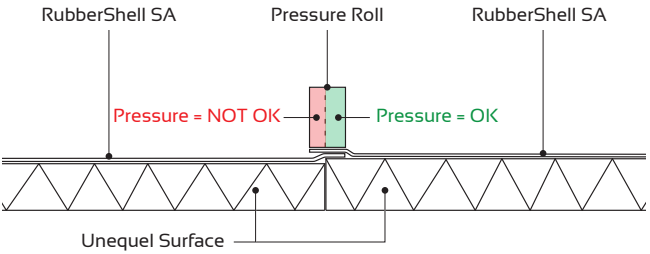
Insert the nozzle at an angle of 45° and keep it as horizontal as possible. Splice the seam in two steps. Place the silicone pressure roll alongside the top membrane edge at a distance of 20 - 40 mm from the nozzle. Apply sufficient pressure while splicing. It is insufficient only to melt the bitumen on the RubberShell EPDM. To make a good splice the RubberShell EPDM should be equally heated as the bitumen layer.

Figure 2



It is not allowed to weld a seam onto a surface with a difference of height (for example: in between uneven insulation boards).

Figure 3



5.4 Splice control and testing

5.4.1. Splice control

Test splices shall be carried out with every hot air machine at the beginning of each working period as well as longer interruptions. RubberShell shall be seamed with the intended machine settings to minimum length 200 mm and width 80 mm. When the splice has cooled down, the splice is peeled by pulling the two sheets apart. When the splice is peeled, it shall delaminate leaving bituminous material on each membrane surface. If the splice doesn't pass this test the equipment must be controlled, adjusted and a new test performed. Regular site splicing is not allowed until an approved test splice has been allowed.

5.4.2. Splice tightness testing

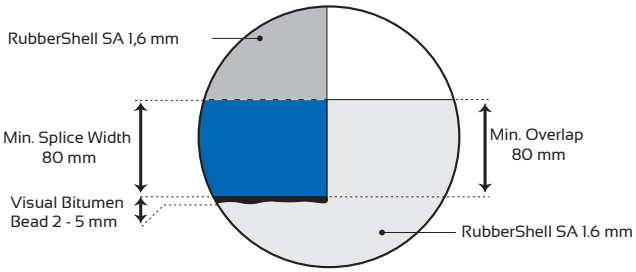
All splices have to be checked and tested, visually, with a blunt object or with air pressure. Extra attention should be addressed at corners, T-joints, penetrations and the roof perimeter. Unequal pressure during welding will result in partially bonded splices. Therefore it is not allowed to have gaps, holes, etc. below the overlap.
If splice strength testing is requested by the building engineer, contact the Technical Department for more information.

5.5 Seam details

5.5.1. Seam detail

The minimum seam overlap and splice width is 80 mm. Details shall be spliced in full.

Figure 4



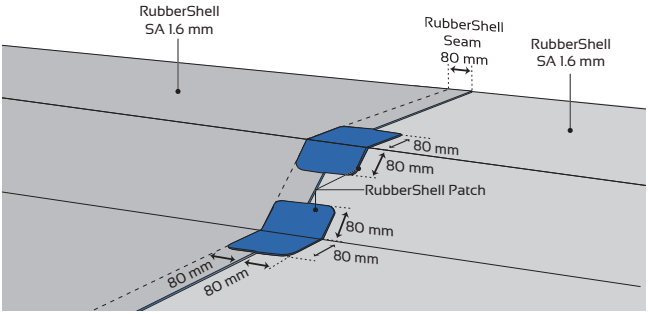
5.5.2. T-joints

T-joints are handled in the same way as a regular seam, 2 – 5 mm bitumen should be visible. When the bitumen bead is not according the prescriptions, an additional patch is needed. The patch diameter should be minimum 160 mm, centrally placed and has to be fully spliced.

5.5.3. RubberShell splice with angle changes

When RubberShell passes over an angle and the membrane is not broken at the upstand, an additional reinforcement has to be installed in the angle. The minimum seam width is 80 mm. Visible corners to be rounded off. Tension in the RubberShell membrane is to be avoided at all times. Break the reinforcement if necessary.

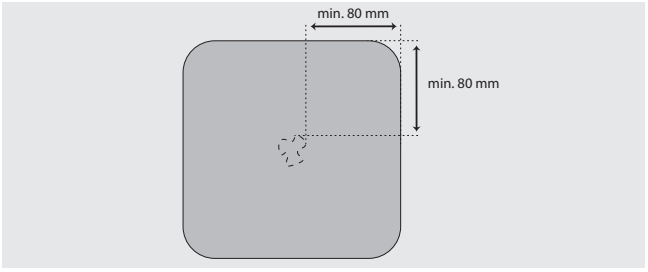
Figure 5



5.5.4. Repairs

Measure the size of the damage and cut a RubberShell piece to the size required. The overlap between the existing membrane and the repair must be at least 80 mm.
The surface of the existing membrane must be ground with a grinding machine (2500 rpm) and nylon disc before splicing. After grinding the surface must be cleaned with water or Cleaning Wash 9700 and be left to dry. Splicing is done according to instructions.

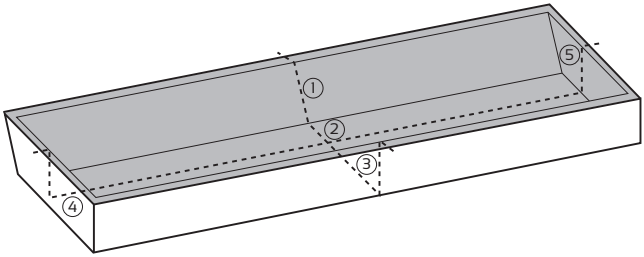
Figure 6



6 Installation Of RubberShell 1.6 mm In A Gutter

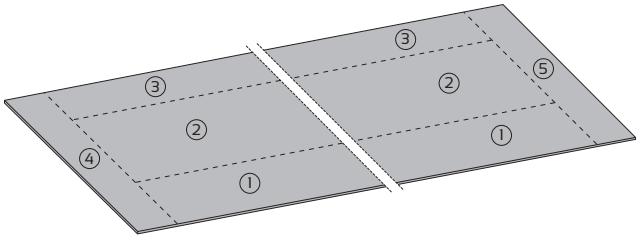
Cut the piece of RubberShell corresponding to the dimensions of the gutter. Make sure to include all upstands and overlaps.

Figure 7



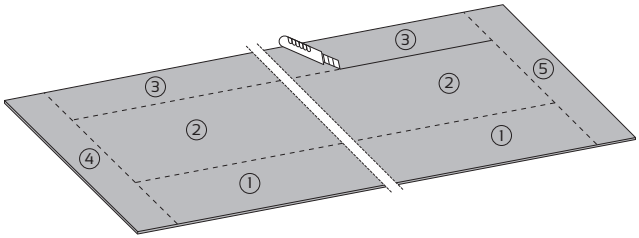
Unroll the RubberShell SA strip on flat surface with the PE release film facing upwards. Transfer the dimensions of the gutter onto the release film.

Figure 8



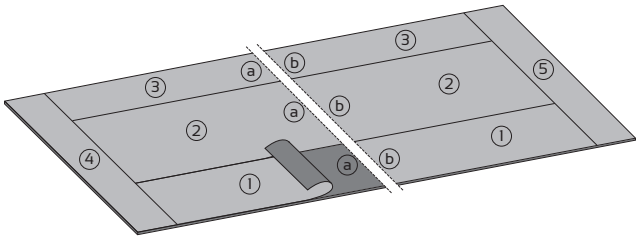
Use a sharp knife to cut the release film. By dividing the film into smaller sections, the installation is made easier.

Figure 9



Cut the release film in the middle to divide the RubberShell SA membrane in two sides a and b.

Figure 10



Fully apply Primer 9800 in the gutter and let it flash off. Place the RubberShell membrane into the correct position. Remove the release film from the membrane, starting with the area representing one of the upstands. Gently push the membrane onto the substrate. Roll the upstand firmly with a silicone pressure roller.

Figure 11

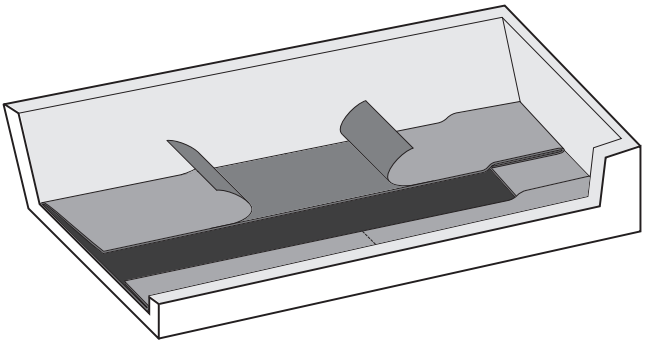
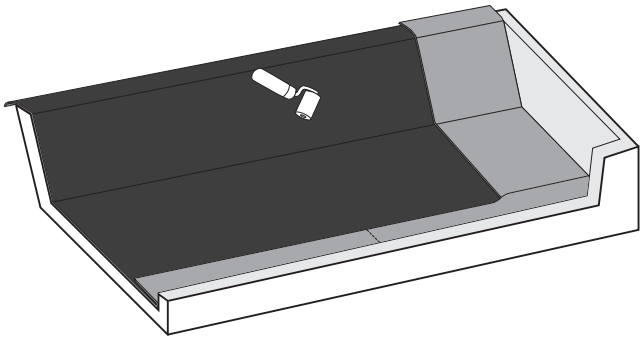


Figure 12



Once the membrane is fixed, remove the release film of the horizontal part. While doing so, keep the film in a 45° angle. Push the membrane onto the substrate and apply pressure with a silicone roller.

Perform the above described actions on the opposite upstand and the adjacent upstands. Prepare the internal corners before adhering the complete adjacent upstand. See chapter 7: Internal corners.

7 Internal Corners

The basic rules for making corners are explained. In case of doubt please contact our technical department. All corner splicing techniques are handled in detail during practical training sessions.

7.1 General Instructions

Important rules to be followed at all times:

- All surfaces should be 100% clean. If not, use Cleaning Wash 9700.
- All corner pieces have to be spliced 100% on the underlying membrane.
- All layers around the corner are properly fixed and adhered.
- Tension in the underlying layers is not allowed at all.
- Primer 9800 shall always be fully applied to all substrats.

7.2 Folded And Heat Welded Internal Corners

Folded internal corners are possible to install as long as the upstand heigth does not exceed 250 mm. If the height exceeds 250 mm, follow the instructions for internal corners on a roof.
Fold the inner corner according to figure 13. Cut the membrane horizontally at the upstand level and vertically into the fold (dotted lines) as shown in figure 14.

Figure 13

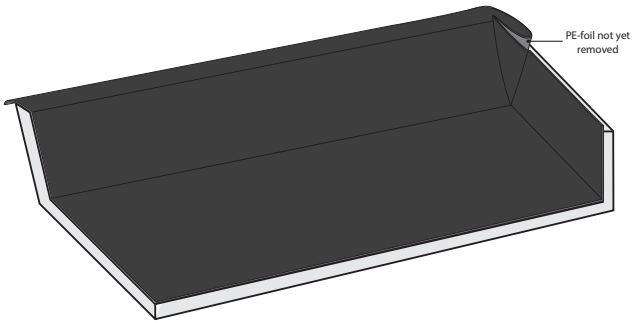
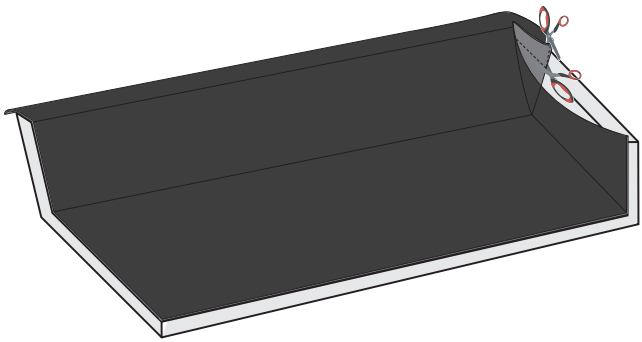


Figure 14



Remove the PE-Foil and adhere the RubberShell 1.6 membrane onto the upstand. Make sure the internal corner is properly folded. While folding the inner corner use left-over bitumen to adhere all layers. Splice all seams with hot air.
Apply Sealant 5590 in the vertical fold of the corner to keep it free from dirt and moisture.

Figure 15

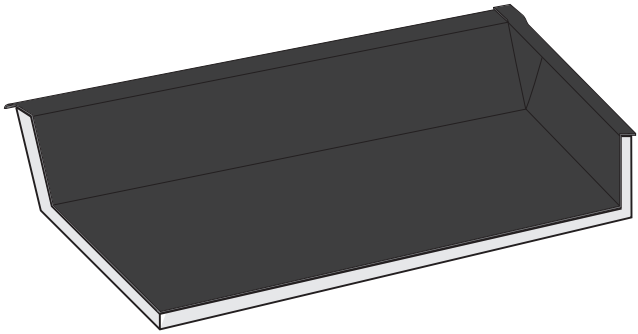


Figure 16

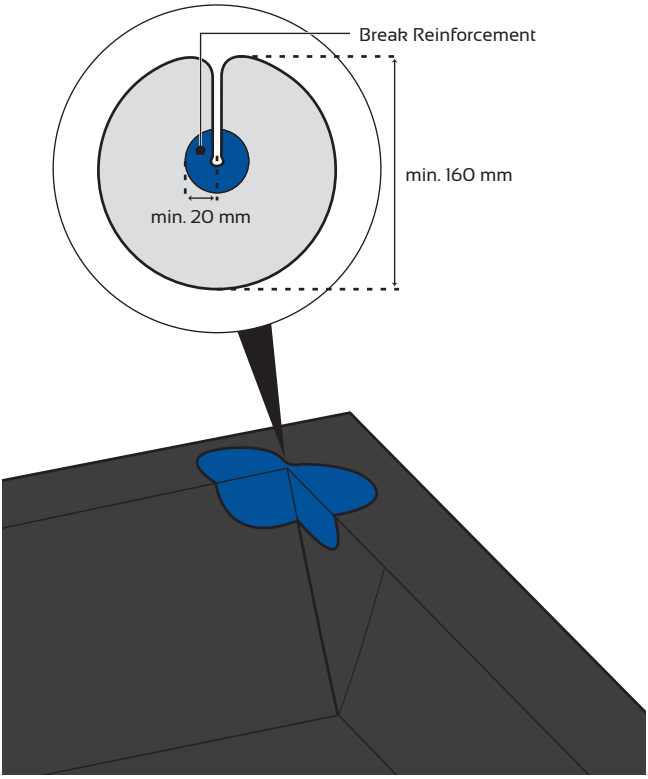
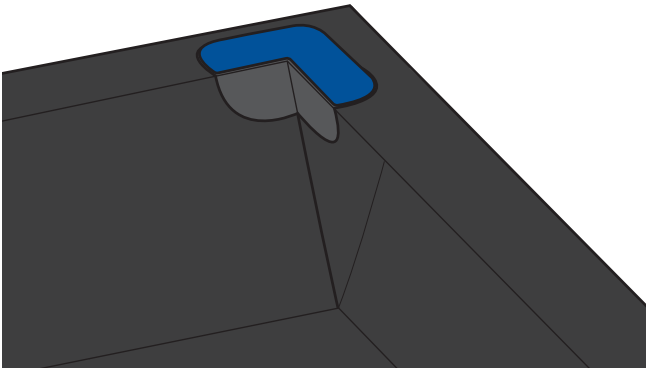


Figure 17



8 External Corners

The basic rules for making corners are explained. In case of doubt please contact our technical department. All corner splicing techniques are handled in detail during practical training sessions.

8.1 General Instructions

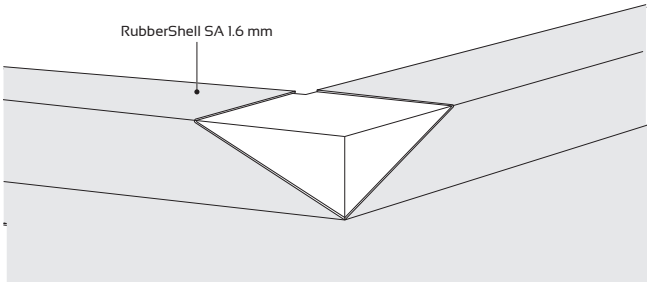
Important rules to be followed at all times:

- The membrane should be 100% clean. If not, use Cleaning Wash 9700.
- All corner pieces have to be spliced 100% on the underlying membrane.
- All layers around the corner are properly fixed and adhered.
- Tension in the underlying layers is not allowed at all.
- Primer 9800 shall always be fully applied to all substrats.

8.2 Installation Of An External Corner

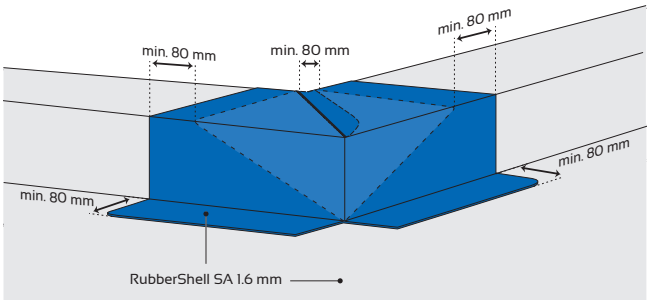
Cut and adhere the Rubbershell membrane as instructed below.

Figure 18



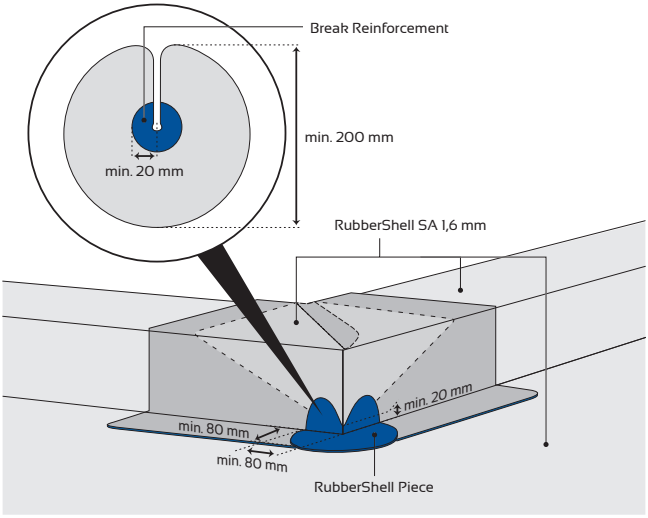
Prepare a seperate RubberShell piece which will be adhered to the surface and spliced onto the underlying membane. Follow all splicing instructions and avoid tension at all times.

Figure 19



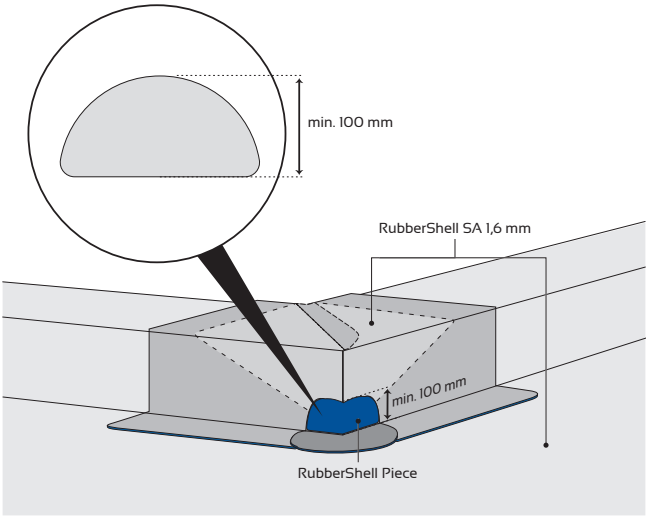
Use a corner piece with a diameter of 200 mm and cut it into a kidney shape. Break the reinforcement minimum 20 mm as indicated in the detail below. Remove the PE-foil and place it onto the outer corner. Make sure it centrally placed with an upstand of minimum 80 mm at both sides and 20 mm where the reinforcement is broken. Tension is not allowed on the corner piece.

Figure 20



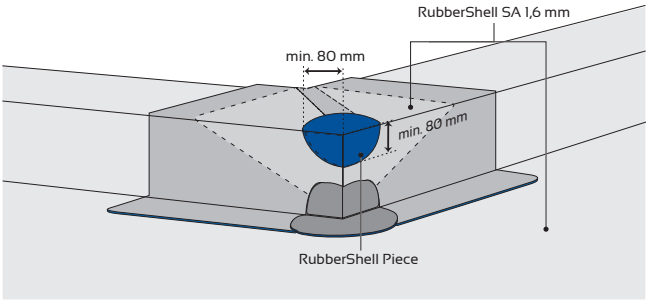
Use a half circular shaped RubberShell piece and install it as indicated on the next figure. Make sure the width of the piece does not exceed the width of the previous installed piece. Weld it with hot air.

Figure 21



Make sure the corner above the outer corner is made watertight. Contact our Technical Department for advice concerning other types of corners. All corner types are shown during a practical training course.

Figure 22



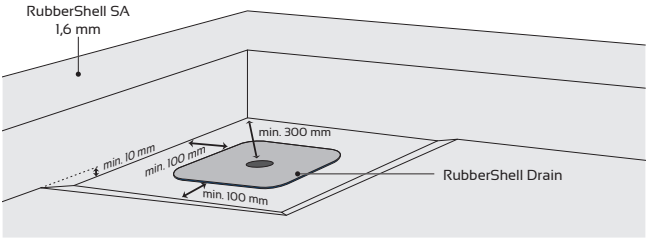
9 Drains

9.1 General Instructions

All water in a gutter has to be drained. Do not underestimate the importance of a roof drain. Follow all national regulations at all times. Important:

- Drains and scuppers must be firmly anchored in the substrate and must always consist of a hard material. The connection to the construction must be air and wind tight, to prevent convection and condensation. When passing a vapour barrier, do not forget to seal this connection airtight.
- The diameter of the drain/scupper is determined according to EN 12056-3. At all times, the maximum permissible water level on the roof must be taken into account. All drains must be installed with a minimum slope of 2% (horizontal drains).
- When a roof drain needs to be connected to a drain pipe, the connection shall be solid and vapour tight!
- When using HDPE drains with EPDM/bitumen flap, only drains delivered by SealEco shall be used (RubberShell Drain). The use of other EPDM/bitumen drains is not allowed.
- When using drains with a clamp ring (ex. Sita or equivalent), do follow the instructions from the manufacturer.
- Follow special instructions for installing a metal drain.
- Make sure the water can be drained. If possible, lower the surface by at least 1 cm.
- To ensure proper splicing, position the drain as instructed. Drains shall not be installed close to parapets or other obstacles. A minimum distance has to be kept to allow proper splicing. If this is not the case, change the concept.

Figure 23



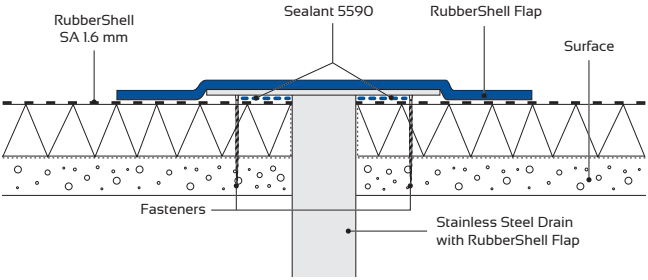
RubberShell drains are installed on top of the RubberShell membrane. Cut out a circular piece, slightly less than the diameter of the drain, where the drain has to be installed. Install the drain according to the prescriptions and weld the entire RubberShell flap with hot air.

9.2 Installation Of A Metal Drain

Metal drains shall be installed on top of the RubberShell membrane. Apply Sealant 5590 in between the metal plate and the membrane. Stay away for at least 50 mm from the edge of the plate. Mechanically fasten the metal drain and apply a RubberShell piece on top of the metal sheet. Splice the whole RubberShell piece with hot air.

ⓘ Note: It is very important that the metal is 100% clean! The installer will take full responsibility when using this type of drains.

Figure 24



10 Supervision And Maintenance

The RubberShell membrane is maintenance free and has excellent durability without any sort of treatment.
The supervision and maintenance of a gutter is the responsibility of the building owner. Experience has taught us however that generally gutters are only inspected when irregularities such as leakages or blocked drains are discovered.
Therefore we recommend, not only that the gutter is inspected by an authorized roofer on a regular base, at least two times per year, but additionally after extreme weather like storms or excessive precipitation. During the inspection the function of the gutter is evaluated and deviations should be handled. Details in the gutter are of higher importance than the surface and should be carefully examined.
Check all sealants, because they are not part of the product guarantee of the RubberShell system.
To maintain good functionality of the gutter it should be cleaned on a regular basis. All foreign objects such as contamination, vegetation and leaves should be removed. It is of extra importance to keep the drainage free so that they can function as intended.
RubberShell should never be exposed to aromatic hydrocarbons such as oil, diesel or fat. If these type of chemicals should leak in the gutter, they must be removed immediately or they will damage the membrane.
If snow or ice needs to be removed, shoveling must be done carefully, leaving minimum 50 mm on the surface to make sure that the membrane isn't damaged by the work.

Leakage

If leakage is detected there can be several reasons and a careful investigation must be done. Leakages do not necessarily mean that there is a problem with the RubberShell membrane.

Finding the problem includes considering:

- Mechanical damage of the membrane?
- When did the leakage first show?
- Weather conditions prior to leakage?
- Clogged drains or bad piping?
- Bad roof windows or ventilation shafts?
- Bad cladding in connection to the roof or the facade?
- Condensation from within due to wrong construction?
- Under what conditions does the leakage start/stop or does it constantly leak?
- Point of leakage in comparison to the slope of the roof (drained area)?

SealEco has well developed techniques for finding leakages and can assist when the origin of the leakage is hard to find.

We make waterproofing easy

Your RubberShell dealer:

JANUARI 2021

For more information, visit **www.SealEco.com**