



 **ECOLINE**
INSTALLATION GUIDE





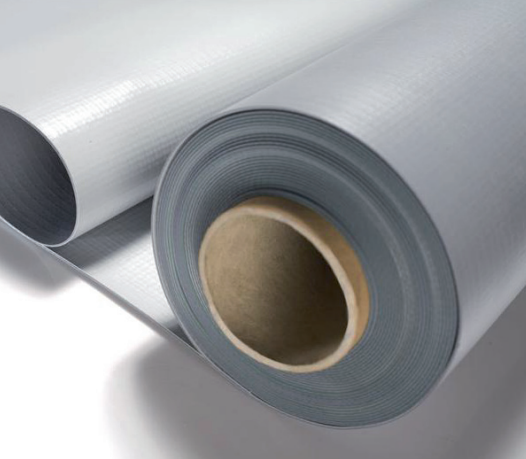


Axter is part of the Bouygues Group of Companies and is one of the world's leading designers and manufacturers of roofing and waterproofing membranes. With over 100 years of experience, Axter specialises in the production of high quality, robust, fully integrated membranes for extensive use in both new build and renovation projects.

Axter's comprehensive product portfolio includes over 700 different systems which have been engineered to provide unparalleled performance and design flexibility. Through our global network of dedicated representatives and our relentless commitment to research and

development, Axter ensures its systems are successfully supplied and installed in more than 60 countries worldwide.

It is Axter's proud tradition in the design and manufacture of high performance waterproofing systems that has facilitated the development of the ECOLINE PVC-p (polyvinyl chloride next generation synthetic membrane system range).



PVC (polyvinyl chloride) is one of the most versatile plastic materials available, is used extensively throughout the world and accounts for over 25% of global plastic production. PVC formulated material is used in various industries such as pharmaceutical, construction, automotive and textile, although the construction industry is the largest consumer of PVC products. This is due to the multitude of suitable applications within this sector such as roofing membranes, flooring, pipes, ducts and windows to name but a few.

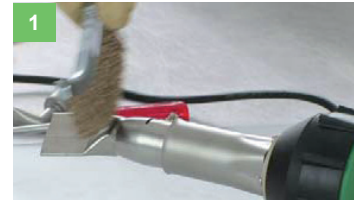
PVC is utilised in so many ways due to its unique characteristics of strength and flexibility. Strength and flexibility ratios can be engineered to suit

the particular application of the material thus ensuring roof membranes are flexible not ridged and remain supple even in extreme cold.

Contrary to most plastics PVC is not 100% produced from fossil fuels as its constituent parts are chlorine, carbon and hydrogen in variable concentration. The principal constituent, chlorine, accounts for approximately 60% of the material and is derived from common salt that is a sustainable raw material with unlimited world supply. Approximately 40% of the raw material is derived from other resources and advanced manufacturing techniques have ensured that ECOLINE membranes have up to 30% recycled content.

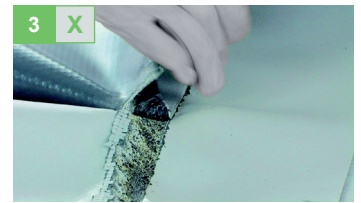
1.1 Preparing hand held equipment (Leister™ Triac – PID or equivalent)

- 1 First ensure the welding equipment is clean and that there is no obstruction to the hot air flow.
- 2 Set the temperature of the equipment to 550°C. Generally hand held welding equipment has 10 temperature settings at 60°C increments.
- 3 Turn on the equipment and wait for it to reach the required temperature before use.
- 4 Upon completion, ensure the equipment is allowed to cool before turning off.



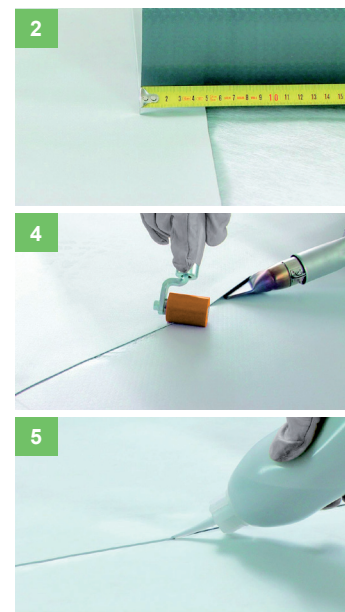
1.2 Confirming the weld

- 1 Weld two strips of membrane in the standard manner.
- 2 Confirm the weld strength by pulling hard on the two opposite ends. The membrane should tear but the weld should remain intact and secure.
- 3 If the temperature of the welding equipment is too high, the membrane will scorch and a secure weld will not be achieved.
- 4 Similarly, if the temperature of the welding equipment is too low continuous weld will not be achieved with areas of the joint not welded. This will be confirmed when pulling on the membrane, as the weld will fail prior to the membrane tearing.



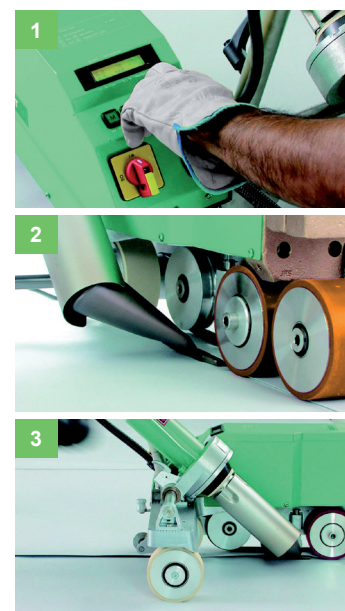
1.3 Welding with hand held equipment

- 1 Welding should be completed using automatic welding equipment wherever practicable. The welding area must be clean and dry. If the membrane to be welded has oxidised due to prolonged outdoor exposure it must be cleaned using E/Clean membrane cleaner.
- 2 Once the hand held equipment is prepared and ready to use, unroll and position the membrane.
- 3 A minimum overlap of 50mm should be provided. On mechanically fixed (FM) systems the minimum overlap should be 100mm. This will ensure the mechanical fixing is completely covered by the membrane overlap.
- 4 It is recommended that the membrane overlap be initially secured by spot welding at 500mm centres.
- 5 Insert the welding nozzle between the membrane overlap at a 45° angle. Weld the membrane by moving the nozzle down the lap continuously in a smooth action. At the same time, apply pressure to the weld with the silicone roller, always working in a forward motion to prevent creases from forming along the weld line.
- 6 For added security and to improve the aesthetic finish of the system it is recommended that the joint be treated with liquid PVC.



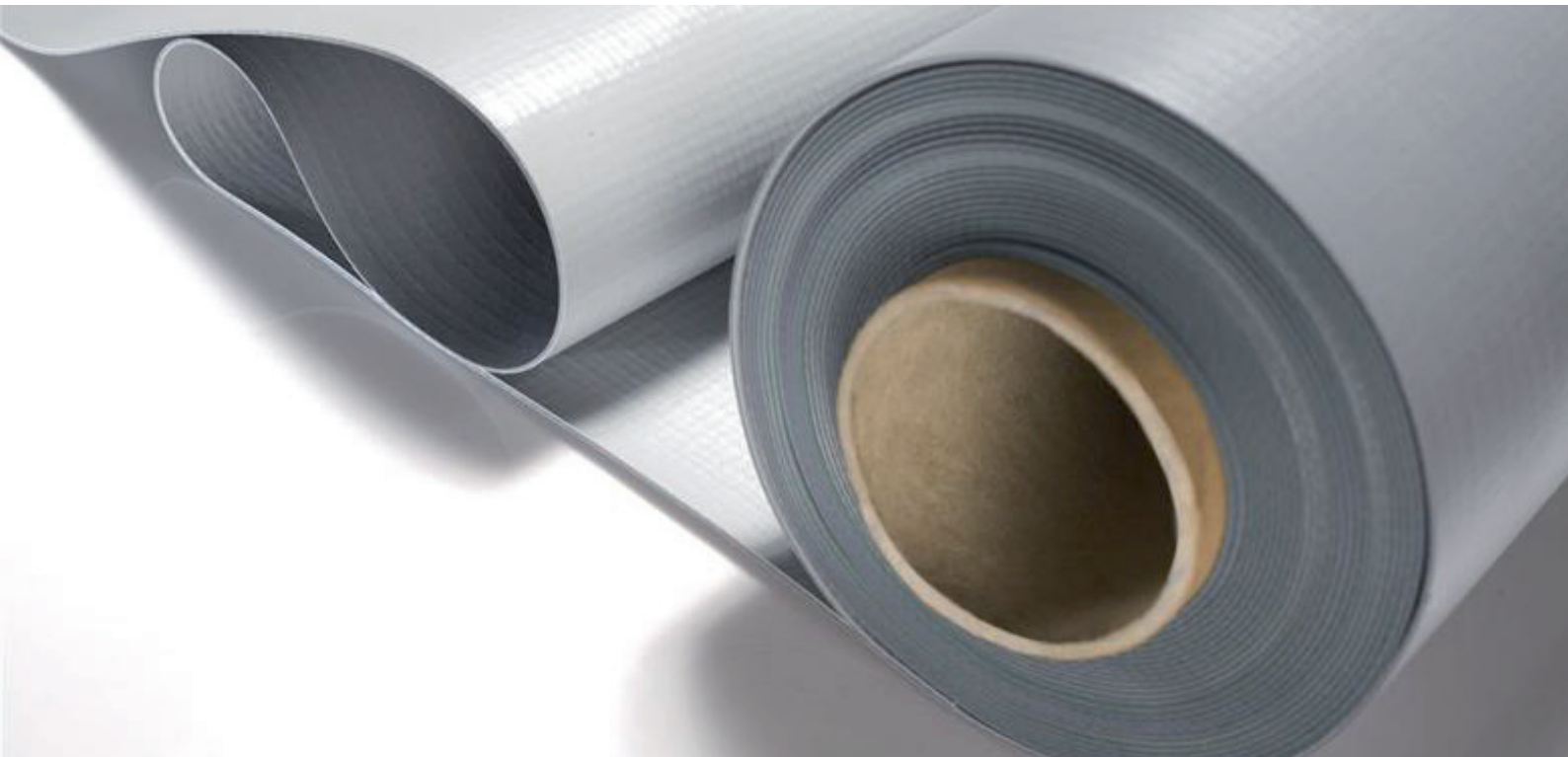
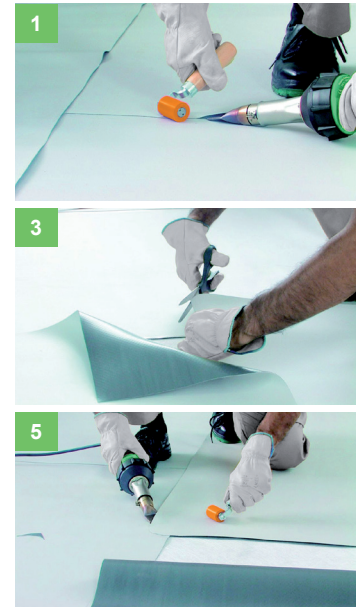
1.4 Welding with automatic equipment

- 1 To reduce installation times on large projects, Axter recommends the use of automatic welding machines such as Leister™ Varimat or equivalent.
- 2 In principle the welding procedure is the same as when using hand held equipment, however the optimum relationship between temperature, speed and pressure must first be established before commencing welding. With an ambient air temperature of 25°C, and using a 40mm weld nozzle, the recommended weld temperature is 560°C with an installation speed of 4.5 metres per minute.
- 3 Place the weld nozzle under the overlap. The welding equipment should only commence once this action has been performed.
- 4 Once positioned correctly weld normally, ensuring the automatic welding equipment operates at the programmed speed.
NB The minimum permitted membrane overlap is:
 - 50mm for adhered (ADH) systems
 - 100mm for mechanically fixed (FM) systems.



1.5 T Joints

- 1 It is recommended to weld transversal joints prior to welding longitudinal joints.
- 2 When T joints occur the edge of the seam should be recessed to avoid the creation of capillary channels. This can be achieved using an 8mm brass roller (See tools and equipment section).
- 3 Always cut membrane corners round to prevent weak spots occurring at the joint.
- 4 Membrane edges should be tapered to reduce the build-up of layers and possible water checks.
- 5 Four layers should not meet at the same point, however, if this does occur joints should be arranged so that they are not aligned transversely.
- 6 Once complete check all joints are installed correctly and are secure.
- 7 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



2.1 Standard Wall Flashing

- 1 Spot weld the top edge of the ECOLINE FM membrane to the E/Metal PVC coated pre formed termination bar. The termination bar must be securely fixed to the substrate at minimum 200mm centres with appropriate mechanical fixings. Ensure mechanical fixing heads are flush.
- 2 Secure the weld of the ECOLINE FM membrane to the E/Metal through applying pressure with the silicone roller. The mechanical fixings should not be visible beneath the membrane.
- 3 Position the ECOLINE FM membrane ensuring a 100mm minimum overlap is achieved. Spot weld the membrane into position and then secure following the recommended welding procedure.
- 4 To complete the detail the head of the termination bar should be struck pointed with an Axter approved polyurethane mastic.

NB Refer to Axter standard ECOLINE details for further information.



2.2 Standard Parapet Termination with Drip

- 1 Position E/Metal pre formed PVC coated metal drip trim on the outer edge of the parapet. The E/metal can be cut to suit the specific site conditions and project requirements. Leave a minimum distance of 3mm between trim lengths. Secure the E/Metal to the structure with appropriate mechanical fixings at minimum 200mm centres. Ensure mechanical fixing heads are flush.
- 2 Position the ECOLINE FM membrane onto the E/Metal with the required overlap.
- 3 Spot weld the ECOLINE FM membrane to the E/Metal so that it is held in position then fully weld the membrane to the E/Metal ensuring all mechanical fixings are covered.
- 4 Now weld the ECOLINE FM membrane to the main field sheet ensuring that a minimum 100mm overlap is achieved and that the restraint bar (where appropriate) is covered.
- 5 Check weld security with a probing tool and apply liquid PVC to the joint seam as necessary.



3. EXTERNAL AND INTERNAL CORNERS

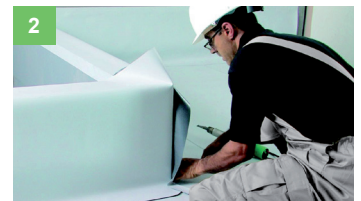
3.1 Upper External Corner

- 1 Prior to installing the membrane, E/Metal pre formed PVC coated metal should be mechanically fixed at minimum 200mm centres to external and internal wall angles. Refer to ECOLINE standard details for further information.
- 2 Position the ECOLINE FM membrane on the wall and spot weld to hold it in place.
- 3 Cut off the excess ECOLINE FM membrane at the fold and cut membrane corners round.
- 4 Fold the corner over and spot weld.
- 5 Next weld the lower part of the ECOLINE FM membrane to the E/Metal, then position the upper part of the membrane.
- 6 Cut the ECOLINE FM at the required angle and discard any excess.
- 7 Weld the overlap following the standard procedure then weld the vertical joint, ensuring care is taken at the corner to achieve a secure and neat weld.
- 8 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



3.2 Lower External Corner

- 1 When installing the ECOLINE FM membrane into a bottom external corner, first position the membrane and mould it into the corner.
- 2 Spot weld the membrane so that it is held in the correct position.
- 3 Cut all membrane edges round.
- 4 First complete the vertical weld then weld the overlap to the main field membrane ensuring the restraint bar and fixings (as appropriate) are covered.
- 5 To ensure a weathertight detail is achieved, install pre formed PVC E/corners at the corner location. E/corners must be fully welded into position. If E/corners are not available on site, corners can be fabricated by trained operatives using the ECO/D 1.5mm non-reinforced membrane.
- 6 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.

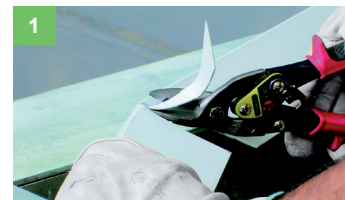


3. EXTERNAL AND INTERNAL CORNERS

3.3 Upper Internal Corner

- 1 Prior to installing the membrane, E/Metal pre formed PVC coated metal should be mechanically fixed at minimum 200mm centres to external and internal wall angles. Refer to ECOLINE standard details for further information.
- 2 Position the ECOLINE FM membrane and cut along the apex.
- 3 Weld the ECOLINE FM membrane to the E/Metal ensuring that all fixings are encapsulated.
- 4 Cut to size a piece of ECOLINE FM membrane to cover the entire surface. Cut a notch out of the membrane at the apex that coincides with the internal corner. Spot weld the membrane section in the centre to hold it in-situ. Fully weld the membrane in place starting from the centre and working outwards, taking care to avoid the creation of air voids.
- 5 To ensure a secure detail is achieved position a pre formed E/Corner (Internal corner) unit over the corner detail. Spot weld the corner in place then fully weld into position working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.

NB If pre formed E/Corners are not available on site corner pieces can be fabricated from ECO/D 1.5mm non-reinforced detail membrane. The membrane should be cut to shape, positioned over the corner and gently heated until it is malleable. Stretch it by hand until it fits the shape of the corner angle, then weld in the corner working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 6 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



3.4 Lower Internal Corner

- 1 Fit the ECOLINE FM membrane to the shape of the internal angle.
- 2 Cut the fold that forms in the corner and discard the excess.
- 3 Spot weld the upper leaf of ECOLINE FM membrane to hold it in place and prevent it from getting in the way whilst working.
- 4 Weld the lower leaf of ECOLINE FM membrane into position ensuring a secure weld is achieved through pressure applied with the silicone roller.
- 5 Next return the upper leaf to close the fold and weld into position working from the inside out, paying special attention to the weld at the apex.
- 6 To ensure a secure detail is achieved position a pre formed E/Corner (Internal corner) unit over the corner detail. Spot weld the corner in place then fully weld into position working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.

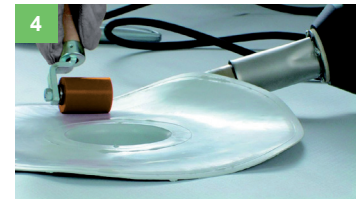
NB If pre formed E/Corners are not available on site corner pieces can be fabricated from ECO/D 1.5mm non-reinforced detail membrane. The membrane should be cut to shape, positioned over the corner and gently heated until it is malleable. Stretch it by hand until it fits the shape of the corner angle, then weld in the corner working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 7 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



4. RAINWATER OUTLETS

4.1 Prefabricated ECOLINE Vertical Outlet

- 1 Prepare a hole at the point where the outlet is to be installed.
- 2 Insert the ECOLINE vertical outlet into the hole.
- 3 Secure the outlet by spot welding the flange. NB if using ECOLINE stainless steel outlet units secure with appropriate mechanical MTP or C fixings and washers in addition to spot welding.
- 4 Fully weld the unit into position working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 5 ECOLINE vertical rainwater outlets are available in various standard sizes to accommodate the project requirements.
- 6 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



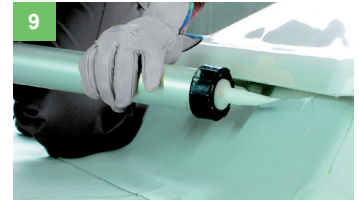
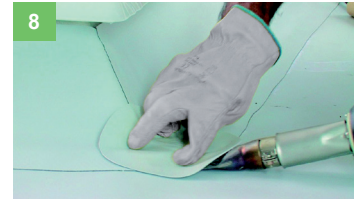
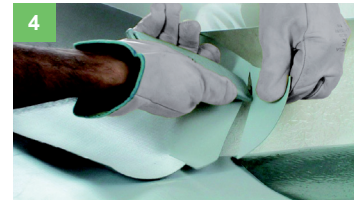
4.2 Prefabricated ECOLINE Parapet Outlet

- 1 Prepare a hole at the point where the outlet is to be installed.
- 2 Insert the ECOLINE parapet outlet into the hole.
- 3 Secure the outlet by spot welding the flange. NB if using ECOLINE stainless steel outlet units secure with appropriate mechanical MTP or C fixings and washers in addition to spot welding.
- 4 Fully weld the unit into position working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 5 ECOLINE parapet rainwater outlets are available in various standard sizes to accommodate the project requirements.
- 6 Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



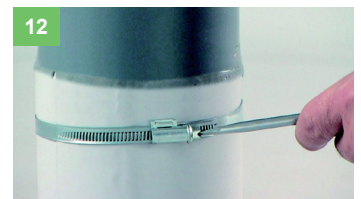
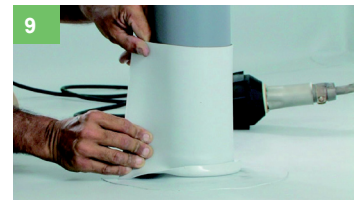
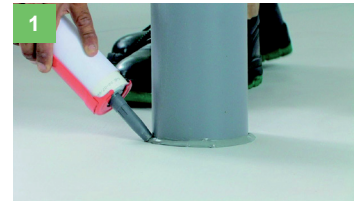
- 1** Prepare and cut four pieces of ECOLINE FM membrane to suit the shape of the rooflight kerb. Ensure the membrane sections are of sufficient size and include an appropriate overlap.
- 2** Apply ECOLINE FM/D contact adhesive to the entire rooflight kerb and underside of the ECOLINE FM membrane. Ensure no FM/D adhesive is applied to the overlap/welding zone of the ECOLINE FM membrane.
- 3** Locate and adhere the membrane sections to the rooflight kerb.
- 4** Adjust and reposition the membrane as necessary, cutting off any excess material as required.
- 5** Check that all membrane sections are secure and fully adhered by applying even pressure to the membrane with your hands or large silicone roller.
- 6** Round off all membrane corners.
- 7** Weld the membrane sections to the main field area in the usual manner. First weld the corners then weld the rest of the overlap working from the inside to the outside edge.
- 8** To ensure a secure detail is achieved position a pre-formed E/Corner (External corner) unit over the corner detail. Spot weld the corner in place then fully weld into position working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.

NB If pre formed E/Corners are not available on site corner pieces can be fabricated from ECO/D 1.5mm non-reinforced detail membrane. The membrane should be cut to shape, positioned over the corner and gently heated until it is malleable. Stretch it by hand until it fits the shape of the corner angle, then weld in the corner working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 9** Finally seal the head lap joint to the rooflight kerb with a bead of manufacturer approved polyurethane mastic. If appropriate a strip of E/Metal can be fixed to the head of the rooflight kerb to secure the weld. Please refer to ECOLINE standard details for further information.
- 10** Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



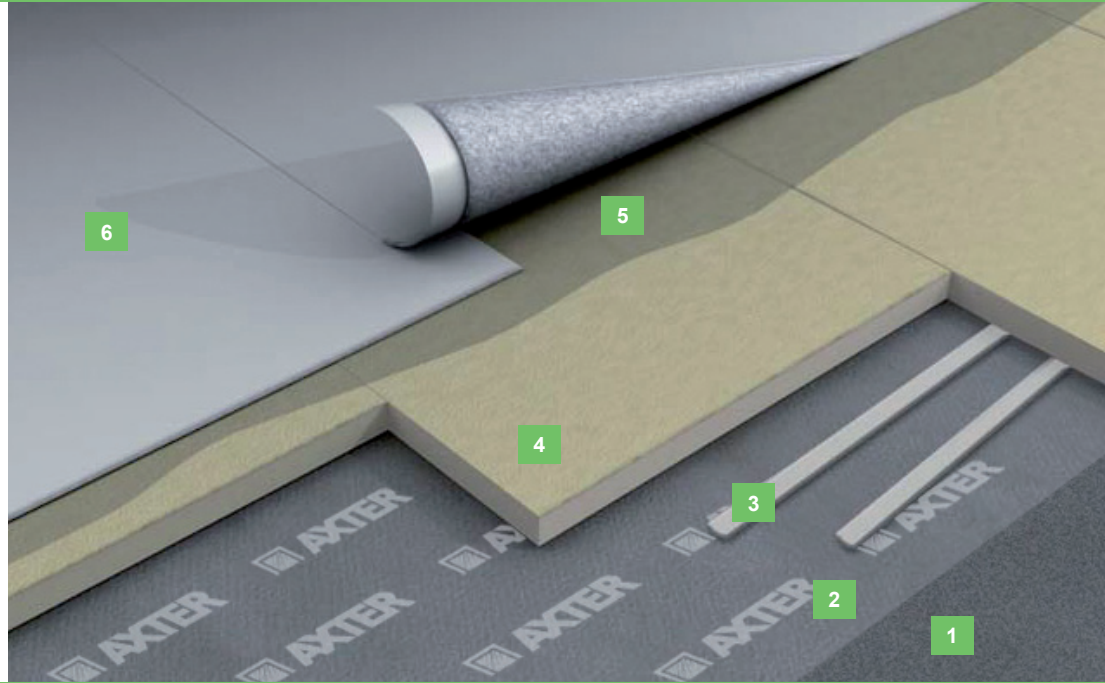
6. SERVICE VENT PIPE (SVP) PENETRATIONS

- 1** When installing the field area waterproofing membrane, make a hole in the membrane around the SVP and seal the joint with a bead of manufacturer approved polyurethane mastic.
- 2** Prepare and cut to size a circular piece of ECO/D 1.5mm non-reinforced detail membrane. Measure the diameter of the SVP and cut a smaller hole in the centre of the ECO/D membrane. Note the diameter of the hole must be smaller than the diameter of the SVP for it to fit securely.
- 3** Gently apply heat to the ECO/D until it is malleable.
- 4** Position the SVP through the hole in the ECO/D membrane and stretch it over and down the SVP. When at the base of the SVP spot weld the membrane into position.
- 5** Fully weld the ECO/D to the field membrane working from the centre out, applying pressure by hand and silicone roller and taking care not to create air voids.
- 6** Next prepare a cylinder shaped piece of ECOLINE FM membrane that is the same diameter of the SVP. Remember to allocate sufficient membrane for the vertical and base lap when cutting the membrane to size.
- 7** Gently apply heat to the membrane until it is malleable.
- 8** Apply FMD contact adhesive to the external surface of the SVP and underside of the ECOLINE FM membrane, ensuring that adhesive is not applied to the lap/weld area.
- 9** Wrap the SVP with the membrane applying even and firm pressure to secure it.
- 10** Round off the corners of the membrane.
- 11** Weld the ECOLINE FM membrane to the field area around the base of the SVP and weld the vertical joint.
- 12** Secure the head of the membrane with a bead of manufacturer approved polyurethane mastic and install a clamping ring to secure the detail.
- 13** Check weld security with a probing tool and apply liquid PVC to all joint seams as necessary.



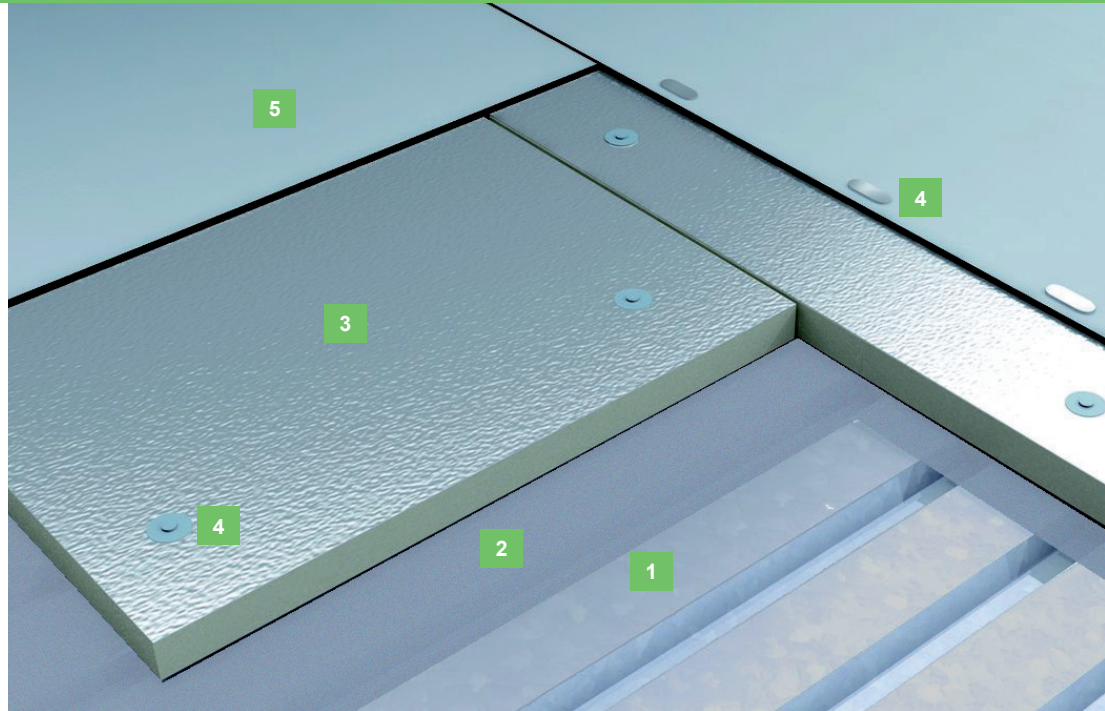
ECOLINE ADH (Fleece backed membrane) fully bonded warm roof system

1	Concrete deck (primed)
2	VAP AL vapour control layer
3	HYRA-STICK PU adhesive
4	HYTHERM ADH Insulation
5	ECOLINE ADH adhesive (solvent free)
6	ECOLINE ADH membrane



ECOLINE FM (Polyester reinforced) mechanically fixed warm roof system

1	Metal deck (primed)
2	VAP IND vapour control layer
3	HYTHERM FM Insulation
4	MTP & I Fixings and washers
5	ECOLINE FM membrane





Full system information is available at www.axter.co.uk.



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