

Prefabrication Manual

Elastoseal T EPDM system

1. Introduction

This Manual describes the methods for prefabrication of Elastoseal T EPDM membrane to large custom designed panels. The Manual constitutes the performance and standard of work to be followed by prefabricators approved by SealEco.

2. Products

Elastoseal T EPDM

Membrane with 36 mm Thermobond splicing edge.

Thickness mm	Width mm	Length mm	Weight kg/mm ²	Weight/roll kg
0,80	1700	25 or 125	0,92	39 or 196
1,00	1700	25 or 125	1,15	49 or 244
1,20	1700	25 or 100	1,38	59 or 293
1,50	1700	25 or 75	1,73	98 or 221

Thermobond Splice Strip

Hot air spliceable splice strip for connections and details.

Splice Strip for Geomembranes			
Thickness mm	Width mm	Length m	Weight/roll kg
1,50	150	20	6,0
1,50	200	20/4 0	9,0
1,50	300	20	12,0
1,50	450	20	18,0
1,50	600	20	24,0
1,50	900	20	37,0
1,50	1600	20	64,0

The standard width for making connections between panels is 200 mm for geomembrane.

Thermobond Hot Melt Sealant

TPE tread for adjusting difference in level and sealing at T-joints. Diameter 4 mm, length 30 m.

Thermobond Hot Melt Strip

TPE strip for adjusting difference in level and sealing T-joints. Thickness 0,70 mm, width 40 mm, length 20 m.

Thermobond Pipe Boot

Boot for pipe penetrations equipped with TPE flange for heat welding to Elastoseal EPDM. Diameter 50 to 150 mm and available in closed or open type.

Prefabrication Manual

Elastoseal T EPDM system

3. Preparations

Before the start of the prefabrication the following items must be available for review, information and control:

- ◇ Construction documents i.e. drawings and specifications for the project, details included.
- ◇ Handling instructions from manufacturer of splicing machinery.
- ◇ Specified materials and quantities according to shipping documents and labels.

4. Requirements

The prefabrication shall be performed using following facilities and assets:

- ◇ A clean and even substrate of adequate size.
- ◇ Access to electricity for splicing machines.
- ◇ 40 mm silicon roll for hand splicing details.
- ◇ Guiding device for wedge machine. This can be a trench or profile made of metal or wood.
- ◇ Handling equipment for lifting and unrolling membrane before splicing. Preferably possible to turn 180 degrees. The possibility to turn the roll makes roll positioning more efficient.
- ◇ Handling equipment for packing panels on cores or folding on pallet after splicing.
- ◇ Brass wire brush for cleaning wedge and pressure wheels.
- ◇ Measuring equipment like tape measure, marking chalk and a pair of scissors for cutting.
- ◇ Equipment for non-destructive and destructive splice controls.

Prefabrication Manual

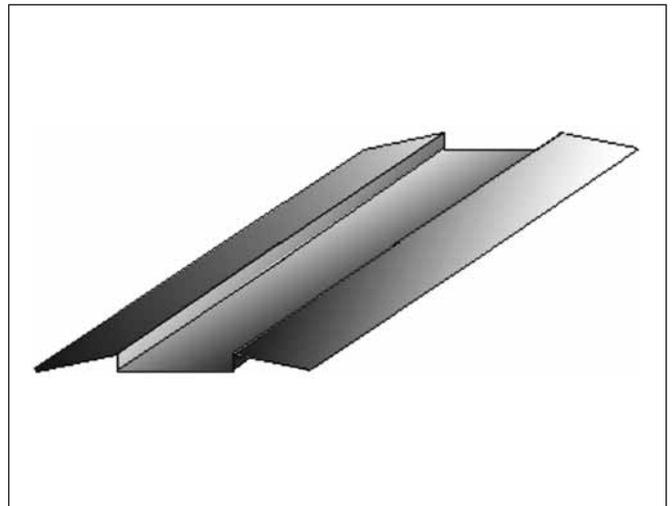
Elastoseal T EPDM system

Splicing machinery

It is important to use the splicing machinery recommended by us to assure proper welding and a good quality.



Leister Twinnny adapted with prefabrication kit are used for splicing Elastoseal T. Leister Twinnny with 50 mm rolls set up for prefabrication without test channel is SealEco article 55999021.



To assure proper steering during prefabrication we recommend the use of a guidance track. The measurement of the track itself should be approx. 250 x 25mm.



Leister Triac are used for splicing details like pipe boots or T-joints. Leister Triac with 40 mm nozzle is SealEco article 5599902.



Leister Varimat is used for splicing Thermobond strip to Elastoseal T.

Prefabrication Manual

Elastoseal T EPDM system

5. Materials handling

Check materials as verified by specifications, shipping documents and product labels. Damaged or missing goods shall be reported immediately. The material shall be stored in their original packaging in a dry, frost free environment protected from dust.

6. Membrane positioning



The positioning of the membrane is easier if the membrane is put in unrolling equipment that can be moved around.



Unroll the first lengthway in required length with the grey Thermobond edge facing upwards, centred in the guiding trench.



Position the second lengthway so that the overlap is aligned with the markings on the membranes that equal 70 mm overlap.



Stretch the membranes so that wrinkles are kept to a minimum.

- ◇ We recommend that the ready panel is installed on site so that the Thermobond edge of Elastoseal T is facing towards the substrate. This is the opposite side facing upwards as during prefabrication.
- ◇ Keep the membrane free from sharp objects at all time and do not walk on surfaces that shall be spliced together.
- ◇ It can give better efficiency during prefabrication if two guiding tracks are being used and that the panels are being folded in between. Much of the prefabrication time lies in material handling so material logistic is a key factor.

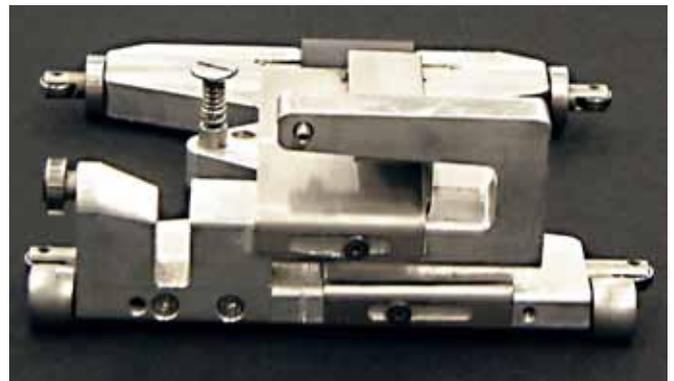
Prefabrication Manual

Elastoseal T EPDM system

7. Splice machine settings

The splicing of the Elastoseal T shall be made with a Leister Twinny that is adapted with a preconfection kit. This equipment have been tested and approved. Other type of machinery might give insufficient heat and pressure.

Prefabrication kit



The prefabrication kit is mounted underneath the Twinny. It is very important that the lower pressure wheel isn't in contact with the driving wheel (the lower black wheel). The machine must pull itself forward in the membrane. The membrane overlap should be adjusted in the machine so that the overlap is set to approx. 38 mm.

Speed and temperature

The Leister Twinny shall be set to the maximum temperature that is 560°C and the speed of approx 2,5 m/min.

Pressure

The pressure shall be set so that a pressure of approx 250 N is achieved. Our recommendation for adjusting pressure is:

1. Cut a piece 50x50 mm of the membrane that shall be spliced.
2. Lower pressure wheels over one layer of the material.
3. Increase pressure to the rolls until the material is compressed but still can be retracted from the machine without too much effort (sideways).
4. Control the pressure by lowering the wheels at the Thermobond edge. The cross knurled pressure wheels shall then leave a noticeable mark in the TPE but not deform.



Prefabrication Manual

Elastoseal T EPDM system

8. Splicing Elastoseal T



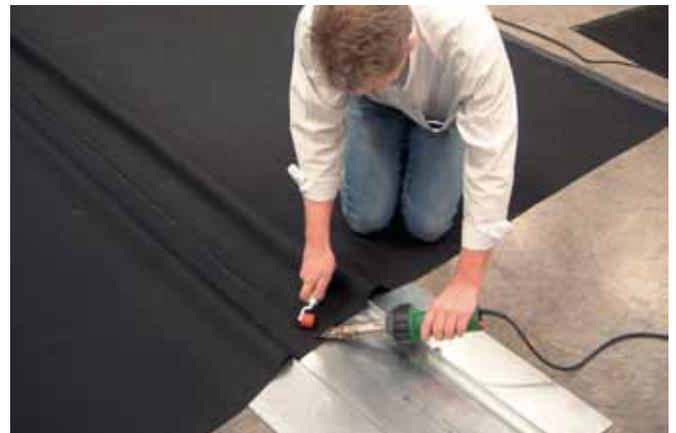
Place the Leister Twiny in position and insert the membrane. Stretch and hold the two layer of membrane when the machine starts.



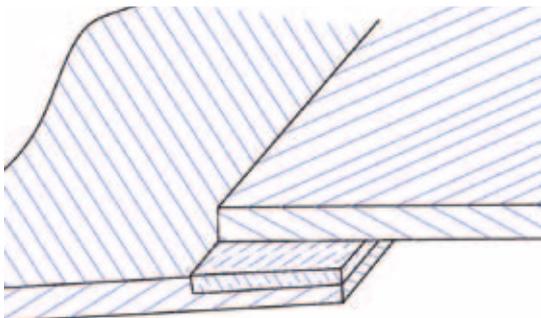
Always control and steer the machine as the splicing goes on. Sometimes the machine needs to be slowed down manually to avoid separation between the membranes.



The hot wedge doesn't close the splice where it has started. Therefore the splice at the starting point shall be torn open until full strength is noted.



Splice the flap by hand alternatively cut this part of the membrane away.



If an Elastoseal T roll shall be spliced cross another Elastoseal T joint the difference in level must be adjusted with hot melt sealant before making this T-joint. It shall also be pressed together after the machine has passed.

- ◇ Note that a Thermobond seam doesn't reach full strength until the material has cooled down.

Prefabrication Manual

Elastoseal T EPDM system

9. Splicing Thermobond splice strip

Connections for field splicing shall be made with Thermobond splice strip.



Mark out a 50 mm overlap on the panel and position the Thermobond strip.



The Thermobond splice strip shall be welded with Leister Varimat.



If the Thermobond splice strip must be prolonged this is done by overlapping the strips minimum 40 mm with the TPE facing upwards and splicing them together with Leister Triac. The difference in height must be levelled with Hot melt sealant where the strip should be spliced to a panel. The width of the hot melt sealant should be min. 50 mm.



If the Thermobond strip is applied transverse to the membrane lengthway this creates a T-joint. The difference in level must be evened out with Hot melt sealant before bringing on the Thermobond strip as previous described. This areas shall be pressed with pressure roll after the splicing machine passes and re-heats the Hot melt sealant.

Prolonging of Elastoseal T

There are some alternative approaches for prolonging Elastoseal T and to cross splice. If the roll are to short one alternative is to store it and use it where convenient. This brings high efficiency in the prefabrication. If cross splicing must be done we recommend the following methods:

1. Overlap the short ends of an Elastoseal T 40 mm and place a Thermobond Hot Melt Strip between the membranes. Insert the overlap in a Hotbond press with a temperature of 180°C and press for approx 15 seconds.
2. Place the short ends of the Elastoseal T butt jointed and seam a Thermobond splice strip as a cover strip. Exaggerate the width and cut the edge away. Make sure that the TPE side of the splice strip is facing the right direction.

For both of these methods the difference in level at T-joints must be adapted with Hot Melt Sealant.

Prefabrication Manual

Elastoseal T EPDM system

10. Quality control

Non destructive testing

The prefabricated splices shall be controlled using the air lance continuity test. The air lance equipment and procedures are generally outlined in ASTM D 4437 and as follows:

1. Air lance test equipment is a compressed air source that continuously delivers an exit pressure of minimum 350 KPa (3,5 Bar) thru a hand held lance with a nozzle diameter of 4,75 mm.
2. The nozzle opening shall be directed to the edge of the seam and held a maximum 25 mm away from the edge.
3. The testing speed shall not exceed 12 m/min.
4. Any defect that is identified by a distinct change in sound shall be marked for repair. The panel as such shall also be controlled visually and approved before packaging.

Destructive testing

A destructive seam testing shall be performed at the beginning of every working shift or when the seam conditions for some reason changes. The seam must have cooled down to approx 20°C before testing.

1. Cut a sample of minimum 300x300 mm with the seam located in the centre of the sample.
2. Pull the sample so that the seam is tested by shear force.
2. The break of the sample shall always occur in the membrane beside the seam.

Typical value while testing the seam in a tensiometer at 500 mm/min are : Seam shear 6,0 N/mm seam peel 2,0 N/mm. A shear test should always give a break in the membrane and not an adhesion break.

11. Package and transport

To protect the splice areas from moisture and contamination the packages shall not be opened until the material shall be prefabricated.

Prefabricated panels can either be folded into a package and put on a pallet alternatively be folded and rolled around a pipe or tube. Regardless what methods that are being used the package shall be wrapped with some kind of protection material to prevent mechanical damages during transportation.

Another critical aspect is that sufficient documentation and information shall follow each package. This documentation shall inform about:

1. Project name and panel identification for traceability and quality control.
2. Unfolding and /or unrolling direction.

12. Defects and repairs

From experience we know that most damages occur due to careless handling of the material. If damage does occur these can be repaired with Thermobond splice strip.

1. Measure and mark out the size of the repair patch needed. The patch of Thermobond strip must be at least 50 mm larger than the actual damage in all directions. The corners of the patch shall be rounded.
2. Splice the patch of Thermobond splice strip using a hand held Leister Triac and a silicone pressure roll.

If the material has been exposed to sun for more than 12 hours before repairing the membrane must be grinded before splicing! This can also be the case if material has been lying in the open indoors for a longer period of time. If uncertainty are at hand a test splice shall be performed followed by destructive splice testing as described above.

Note that the membrane must be completely dry before repairing.

All rolls delivered are marked with roll number as identification. This gives traceability and roll number shall always be noted while handling claims.

13. Technical guidance

The technicians of SealEco provide training and guidance regarding prefabrication of Elastoseal T.