3.2 Splicing

3.2.1 Splicing General

There are two types of seams in the Firestone EPDM roofing systems:

- Factory seams: when splicing is performed during the production of the EPDM sheet prior to vulcanisation. The material of the seam is homogeneous and 100% cured. This results in large, seamless EPDM panels, so as to minimize the number of field splices.
- Field seams: when splicing is performed on site with a self-adhering Splice Tape.

In this section particular attention is given to the Firestone EPDM field seams and the related splicing operations in the different Firestone EPDM systems.

- Splicing Mechanism

The Firestone EPDM membrane is a 100% vulcanised material. Two overlapping sheets are chemically inert to each other and do not stick when simply laid together. Welding techniques or solvents cannot be used to melt the EPDM membrane. Two adjoining sheets therefore have to be joined with a material that is chemically active, the self-adhering Splice Tape combined with the primer QuickPrime Plus. A successful splice will depend on a sound contact of the bonding agent and the membrane. For this reason the surface has to be prepared with utmost care.

The surface of the EPDM sheet examined under a microscope, is not completely smooth, it looks like an orange skin, full of small irregularities and ridges. It is important to observe that the surface is not very clean but covered with dust and talc.

By scrubbing the surface with a scrubber pad, soaked with QuickPrime Plus, the irregularities are changed, creating a receptive surface for contact. The active molecules of the QuickPrime Plus are carried by a solvent, which provides a proper spreading and a deep penetration of the components into the surface irregularities. When most of the solvent is evaporated, the QuickPrime Plus is still chemically active and provides a tacky surface for the Splice Tape to be installed to complete the splicing procedure.
In addition to the adhesion mechanism (attraction between adhesive and surface molecules) the irregularities of the membrane surface are mechanically interlocked by the components of the QuickPrime Plus. Both mechanisms create high-resistance molecular links. It will take 7 to 28 days for the QuickPrime Plus to lose its remaining solvent and therefore complete the curing process.

Experience to date has demonstrated that the EPDM field splicing technique using Splice Tape and QuickPrime Plus is very “roofer friendly”. This installation method satisfies the normal day-to-day variations such as climatic conditions, different applicators and job conditions. The QuickScrubber kit, QuickScrubber Plus Stand-up Tool and QuickTaper make the application of the primer and tape easy, clean, quick and reliable.

The application techniques for the QuickPrime Plus, as described in the seaming procedures are also applicable to the system details where other QuickSeam products are used, i.e. application of QuickSeam FormFlash, QuickSeam Batten Cover Strip, QuickSeam R.M.A. Strip, base tie-in with QuickSeam Reinforced Perimeter Fastening strip, flashing of metal edge profiles with QuickSeam Flashing, flashing of pipe penetrations with QuickSeam Pipe boot, flashing of drains with QuickSeam SA Flashing, etc. All splicing surfaces must be free of dirt, moisture and any other contaminants before the installation of QuickSeam Products. When necessary, pre-clean with the cleaning agent Splice Wash prior to the application of QuickPrime Plus.

Notes:
- As an alternative to regular seaming and flashing procedures using QuickSeam products in combination with QuickPrime Plus, contact adhesives (Splice Adhesive) could also be used. It should be noted however that adhesive seams are more critical than QuickSeam solutions. When applying the Splice Adhesive option, the membrane should be cleaned using Splice Wash. Other cleaning products, such as unleaded gasoline are not recommended. They may be contaminated with traces of products that may react adversely with EPDM and fail to activate the surface in the same manner.

- All seaming products (QuickSeam Splice Tape, QuickPrime Plus, sealants, ...) have product limitations. Follow the technical specifications outlined in the Technical Information Sheets to ensure correct application. Store all Firestone materials in their original sealed pails or unopened packages and rotate perishable materials so that they are used prior to the end of their shelf life.

- Firestone recommends storing primers and sealants at room temperature between 15°C and 25°C. If exposed to lower temperatures, restore to room temperature during 3 to 4 hours prior to use. Splicing activities may continue in cold weather provided adhesive, QuickPrime Plus and sealants are at room temperature prior to application and are used within a 4-hour period after being taken to the roof. Stir primer thoroughly before and during use. This is a critical step that assures that the material performs properly; do not alter the products by adding solvents.

- Attention must be paid to primer in warm weather conditions. Extreme warm weather may dry out the solvents quickly. This can be avoided by protecting the pails against hot temperatures by installing an insulation board between can and membrane on hot summer days and sheltering cans from direct sunlight. Any questions about the condition of a product should be discussed with Firestone Building Products’ Technical Department. Please note the production date of the product.

- Some types of insulation materials such as extruded and expanded polystyrene should not come into contact with QuickPrime Plus. It is recommended to install a 500 mm wide strip of polyethylene underneath the membrane in the splicing area, to protect these insulation materials.
3.2.2 Splicing With 76 mm (3”) Splice Tape

![Diagram of splicing with 76 mm Splice Tape]

**Applicability**

Firestone’s 76 mm (3”) Splice Tape is designed for field splices in all systems as indicated in the table below.

<table>
<thead>
<tr>
<th>System</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ballasted, Inverted, Adhered</td>
<td>All seams</td>
</tr>
<tr>
<td>R.M.A., M.A.S.</td>
<td>All seams</td>
</tr>
<tr>
<td>B.I.S.</td>
<td>End laps only (152 mm Tape for side laps)</td>
</tr>
<tr>
<td>All systems</td>
<td>Laps EPDM flashings</td>
</tr>
</tbody>
</table>

**Installation Instructions**

*Step 1: Position and mark the sheets*

Position the sheets at the splice area with an overlap of min. 100 mm. Once both membranes are in place, mark the bottom sheet 10 to 15 mm from the edge of the seam every 300 mm with the white crayon provided.

![Diagram of position and marking]

Use the index finger as a guide along the top edge; this gives an accurate measurement for this step. The marks will serve as a guide for the application of the QuickPrime Plus and installation of the Splice Tape.
**Step 2: Fold back the lap edge**
Tack the top sheet back with QuickPrime Plus at 1.5 m centres and at factory seams, this holds it in place during the splicing operation.

![Fig. 3.2.6](image-url)

**Step 3: Apply QuickPrime Plus**
Remove excess dust and dirt on the sheet and at factory seams, using a stiff broom. Pre-scrubbing is required at all areas that have excess amounts of dust, mica and Bonding Adhesive and at all factory seams. Dip the QuickScrubber or QuickScrubber Plus stand-up tool into the QuickPrime Plus, keeping the scrubber horizontal and flat so that no primer drips out prematurely.

![Fig. 3.2.7](image-url)

![Fig. 3.2.7 bis](image-url)

Apply the QuickPrime Plus using long back and forth scrubbing strokes, parallel to the seam along the length of the splicing area, until the surface becomes dark grey in colour with no streaking or puddling. Scrub both surfaces at the same time to allow the same flash off time, start on the folded overlap. Make sure to overlap the guide marks on the bottom sheet and go beyond the edge of the top sheet.
**Step 4: Check QuickPrime Plus for dryness**
Allow the QuickPrime Plus to flash off completely. To test for dryness, use the touch-push test at the back of the splice area by pushing straight down onto the QuickPrime Plus with a clean, dry finger. Push forward on the primer in an angle. The primer should feel tacky but not string to the finger.

![Fig. 3.2.8](image)

**Step 5: Install 76 mm (3”) Splice Tape**
Position the 76 mm (3”) Splice Tape on the bottom sheet with the release paper facing upwards. Align the edge of the release paper with the marks. Roll the tape immediately using the QuickRoller or a 50 mm wide silicone rubber hand roller, applying firm pressure across the tape to remove any air that may be trapped between primer and tape. Hand pressure is not sufficient to seal the seam, since it does not provide uniform compression.

![Fig. 3.2.9](image)

**Step 6: Check Tape Alignment**
Untack the top sheet and allow it to fall freely onto the tape. Trim the top sheet back as necessary at all areas where the tape does not extend 5 to 15 mm past the seam edge.

![Fig. 3.2.10](image)
Step 7: Remove paper backing
To remove the release paper from the tape, peel the paper off the Splice Tape, by pulling it away from the seam at a 90° angle to the tape. Pull the paper at a steady pace and keep it low to the roof surface as it is removed to reduce air pockets. Mate the entire length of the seam by hand, when the release paper is being removed.

![Fig. 3.2.11](image)

Step 8: Roll the seam
Roll the seam with the QuickRoller or with a 50 mm wide silicone rubber handroller, both across the seam (1) and along its entire length (2) above both edges of the tape.

![Fig. 3.2.12](image)  ![Fig. 3.2.12 bis](image)

- **Installation Tips:**
  - Before tacking back the membrane, ensure that the QuickPrime Plus is thoroughly stirred and poured into a small bucket.
  - Assemble the QuickScrubber pad by twist-locking it into the Scrubber handle. Scrubber pads will last for approximately 30 lm of seam for the QuickScrubber hand tool and 60 lm of seam for the QuickScrubber Plus stand-up tool. Change to a new pad when the pad becomes compressed or when it has dried primer on it. Change the pad at the start of each working day.
  - In a normal application, three strokes are typical. The first stroke is to spread the QuickPrime Plus and scrub the membrane; second stroke is to scrub the membrane and penetrate the Primer, the third stroke if necessary would be to eliminate puddles of QuickPrime Plus.
  - When using the QuickScrubber Plus stand-up tool enough pressure should be applied to flatten the slightly bowed scrubber to the surface resulting in a uniform application of the QuickPrime Plus.
  - Pre-scrubbing the areas with excess dirt will help the priming process. Three to five strokes with the QuickScrubber, perpendicular to the seam edge is necessary.
  - Precautions should be taken when using QuickPrime Plus in cold weather conditions (below 10°C). Certain combinations of temperature and humidity may cause condensation to form on the surface of the primer. If this occurs, stop priming, wait for better ambient conditions prior to drying the surface and re-application of the QuickPrime Plus.
Complete a test splice to determine the risks for condensation. Never use heat guns or torches to accelerate the drying process of QuickPrime Plus. In normal conditions QuickPrime Plus will flash off in 5 to 10 minutes, quicker in hot weather.

In hot weather Firestone recommends to apply QuickPrime Plus first onto the bottom sheet, to check for dryness and to install the tape. After the tape has been rolled, apply QuickPrime Plus to the top sheet, check for dryness, untack the top sheet and allow it to fall freely onto the tape. Then follow instructions step 6 through 8 to complete the seam.

During the positioning of the tape on the bottom sheet, misalignment may occur. Stop the operation, cut the Splice Tape, make an overlap of minimum 25 mm with the end of the installed tape and continue the alignment with the markings. Cutting the tape should be done with the tape sandwiched between 2 pieces of release paper for a clean cut.

Any fishmouth that occurs during installation of the tape should be cut away and repaired with a piece of QuickSeam FormFlash/Flashing, covering the perimeters of the cut by minimum 75 mm in all directions.

After closing the seam, it is important to observe a continuous mark of primer beyond the fold line of the top sheet.

When using the QuickRoller make sure to roll the seam along its length in a back and forth motion; 50 to 75 cm at a time until the seam is completely rolled.

**Special Considerations**

*End of Splice Tape*

When the seam is longer than the tape, the adjoining roll of tape must overlap a minimum of 25 mm. At these areas a QuickSeam patch should be installed as illustrated. Apply Lap Sealant around all exposed cut edges of the QuickSeam FormFlash.
**T-joints**

There are two types of T-joints possible, depending whether the transversal joint covers the longitudinal or vice versa. In both cases, a QuickSeam patch is necessary to the dimensions as illustrated below.

When the transversal seam lies on top, trim the QuickSeam Splice Tape so that the edge of the tape and the edge of the EPDM membrane are flush. Cut any excess of EPDM membrane at the inside of the seam away in a 45° angle. Install a QuickSeam patch over the T-joint area as illustrated below. Seal all exposed cut edges of the covering piece with Lap Sealant.

![Fig. 3.2.14.a](image1)

![Fig. 3.2.14.b](image2)

![Fig. 3.2.14.c](image3)
When the longitudinal seam lies on top, install a QuickSeam patch as illustrated.

![Fig. 3.2.15.a](image1)

![Fig. 3.2.15.b](image2)

![Fig. 3.2.15.c](image3)

When using reinforced EPDM membrane, seam edge treatment with Lap Sealant is required at all cut edges.

![Fig. 3.2.16](image4)
3.2.3 Splicing With 152 mm (6”) Splice Tape

Applicability
Firestone’s 152 mm (6”) Splice Tape is designed for field splices where batten strips are installed within the seam as in the B.I.S. system. This seaming technique can also be used in R.M.A. and M.A.S. systems and in flashing details where EPDM is used.

Installation Instructions

Step 1: Position and mark the sheets
Position the sheet at the splice area with an overlap of 200 mm. Once both membranes are in place, mark the bottom sheet 10 to 15 mm from the edge of the seam every 300 mm with the white crayon provided using the index finger as a guide along the top edge. Fold the top membrane back and install the batten strip 80 mm inwards from the marks. This will ensure that the tape is evenly distributed within the seam when applied along the marks. Allow the top sheet to fall back freely and verify correct alignment of membranes and batten strips.

This step is critical; therefore double-check the seam area to ensure proper placement of the batten strips and correct overlap of adjacent sheets. It is also important that the fasteners in the batten strip are not overdriven. The seam functions best when the surface to receive the tape is as flat as possible.
**Step 2: Fold back the lap edge**
Fold the top sheet back to expose the seaming area and tack it back with QuickPrime Plus at 1.5 m centres and at factory seams.

![Fig. 3.2.19](image)

**Step 3: Apply QuickPrime Plus**
Apply the QuickPrime Plus using long back and forth strokes, parallel to the seam along the length of the splicing area, until the surface becomes dark grey in colour with no streaking or puddling. Ensure that primer is applied over the batten strips. Pre-scrubbing is required at all areas that may have excess amounts of dust, mica and Bonding Adhesive and at all factory seams.

![Fig. 3.2.20](image)  
![Fig. 3.2.20 bis](image)

**Step 4: Check QuickPrime Plus for dryness**
Allow the QuickPrime Plus to flash off completely (usually less than 10 minutes). To test for dryness, use the touch-push test.

![Fig. 3.2.21](image)
**Step 5: Install 152 mm (6”) Splice Tape**

Use 2 individuals to position the Splice Tape on the bottom sheet with the release paper facing upwards. One person should be at the start of the seam; the other should handle the roll. Use the first three marks for tape alignment. It is important that the tape roll is straight. After the tape is installed on the first three marks, the first person should compress the tape along its length using a clean QuickScrubber pad and handle. The tape should be compressed down the centre of the batten strip, followed by the compression on each side of the strip.

The second person handling the roll should hold the roll of tape firmly in place with both hands. The thumbs should be on both sides of the tape guiding it. Do not allow the tape to waiver from the marks. If this occurs, cut the tape, overlap 25 mm, and continue alignment.

![Fig. 3.2.22](image_url)

**Step 6: Check tape alignment**

Untack the top sheet and allow it to fall freely over the release paper. Trim the top sheet back as necessary at all areas where the release paper on the tape does not extend 5 to 15 mm past the seam edge.

![Fig. 3.2.23](image_url)

**Step 7: Remove paper backing**

Remove the release paper from the tape by pulling at a 90° angle away from the seam. Pull the paper at a steady pace and keep it low to the roof surface as it is removed to reduce air pockets. Mate the entire length of the seam by hand following the removal of the release paper.

![Fig. 3.2.24](image_url)
**Step 8: Roll the seam**

Roll the seam using a 50 mm wide silicone rubber roller, both across the seam (1) and along its entire length (2) above both edges of the tape. Do not use Quickroller.

![Fig 3.2.25](image)

**Note:** The same special considerations as previously described are applicable at T-joints, where adjoining tapes overlap and with regard to seam edge treatment for reinforced membranes.
### 3.2.4 Splicing With QuickSeam Batten Cover Strip

**Applicability**

The QuickSeam Batten Cover Strip is designed for covering batten strips which are installed over the membrane (not within a seam area) in the mechanically attached system M.A.S..

**Installation Instructions**

It is important that all batten strips installed over the EPDM membrane are covered with a Cover Strip prior to the end of the working day.

Apply the QuickPrime Plus along the length of the strip to cover a minimum of 100 mm at both sides, following the same technique as previously described. Use long back and forth strokes with moderate to heavy pressure, until the surface becomes dark grey in colour. Also apply primer over the batten strips with no puddling. Allow the primer to flash off completely before applying the Cover Strip. To test for dryness, use the touch-push test.

Centre the Cover Strip over the batten strip, starting a minimum of 75 mm ahead of the batten strip as illustrated. Unroll the Cover Strip along the batten strip and mate it with the primed surface. Peel away the release paper as the strip is installed. Cut the Cover Strip to stop 75 mm beyond the end of the batten strip run. Roll the entire Cover Strip using a 50 mm wide silicone rubber roller. Roll perpendicular to the batten strip and then parallel to the strip over the exposed butyl edge, protruding at both sides of the strip. Seal all exposed cut edges with Lap Sealant.
**Special Considerations**

At the end of a QuickSeam Cover Strip roll, the adjoining roll shall overlap a minimum of 25 mm. Apply QuickPrime Plus in the overlapping area and allow the primer to flash off prior to splicing the overlap. Install a QuickSeam patch as illustrated below.

![Fig. 3.2.27](image)

At all junctions where Cover Strips overlap field seams, a QuickSeam patch should be installed with dimensions as illustrated below. An alternative is to interrupt the batten strip and Batten Cover strip at the crossing of the field seam, allowing an interval of 200 mm max between batten strips.

![Fig. 3.2.28](image)

Cover Strips should not overlap at T-junctions, detail as illustrated.

![Fig. 3.2.29](image)
3.2.5 Splicing With QuickSeam R.M.A. Strips

- **Applicability**
  The QuickSeam R.M.A. strip is designed to offer non-penetrating mechanical attachment in the R.M.A. system.

- **Installation Instructions**

  **Step 1: Install QuickSeam R.M.A. strips**
  Mechanically attach the QuickSeam R.M.A. strips to the substrate as per the wind uplift requirements. The QuickSeam R.M.A. strips can be attached using approved plates and fasteners or batten strips and fasteners. The EPDM membranes are loose laid over the QuickSeam R.M.A. strips in the most appropriate direction.

  ![Fig. 3.2.30](image)

  **Step 2: Position the EPDM sheets**
  Fold back the EPDM membrane to expose the QuickSeam R.M.A. strips. When working with small widths of membrane or in windy conditions, tack the EPDM membrane back onto itself with QuickPrime Plus or use temporary ballast to keep the membrane in place.

  ![Fig. 3.2.31](image)

  **Step 3: Apply QuickPrime Plus**
  Apply QuickPrime Plus to the back of the EPDM membrane over the width of the QuickSeam R.M.A. strip and eventually to the portion of the QuickSeam R.M.A. strip without tape. For ease of application it is recommended to use the QuickScrubber Plus stand-up tool. Make sure that the primer has been applied to a sufficient width and quantity. This step is critical; therefore double-check the seaming area for a correct application.
3. Installation

**Step 4: Remove paper backing**
Allow the QuickPrime Plus to flash off completely. To test for dryness, use the touch-push test. Remove both release papers from the QuickSeam R.M.A. strip and roll the field membrane onto the strip, keeping a rounded leading edge to avoid wrinkles. Hold both hands on top of the primed membrane when rolling it in, to avoid wrinkles.

**Step 5: Roll the QuickSeam R.M.A. strip**
Roll the strips using the QuickRoller stand-up tool or a 50 mm wide silicone rubber roller, both across the strip and along its entire length above both tapes (both edges).
3.2.6 Splicing With Splice Adhesive

Applicability
Experience has learned that QuickSeam details are far more reliable, quick and cost-effective than Splice Adhesive details. Therefore the QuickSeam solution should always be the method of choice for any seaming or detailing application. If for some specific reason a QuickSeam solution is not available, Splice Adhesive alternatives could be used to splice together EPDM with EPDM or regular FormFlash with EPDM at details if the following installation instructions have been met.

Installation Instructions
- EPDM to EPDM and/or FormFlash to EPDM overlaps should always have a minimum width of 100 mm of adhesive seam.
- Remove excess of dust, dirt and other contaminants from the EPDM membrane by brooming or wiping. If necessary, scrub the splice area with soapy water and rinse with clean water.
- Use clean cotton rags to clean the mating surfaces thoroughly with Splice Wash in a circular motion forward; allow to dry. Adequate cleaning has been achieved when the surface is dark grey in colour and no streaking is evident. Cotton rags must be replaced with clean ones as they become dirty. FormFlash material is clean and not dusted and does not need to be pre-cleaned.
- Apply the Splice Adhesive using a 100 mm wide by 12 mm thick solvent resistant brush in an even, smooth coat. Use long back and forth strokes, so that brush marks bleed out, leaving a smooth, glossy adhesive surface. Apply the Splice Adhesive to both mating surfaces at about the same time to allow approximately equal flash off times. Avoid puddling and do not overwork the adhesive. Use of paint rollers is not allowed as application rates are uncertain. Where other seams (field or factory) cross a field seam, use one short back stroke perpendicular to the seam to leave extra adhesive at the step off.
- Allow the adhesive to flash off completely, use the touch-push test to check: touch the adhesive surface in the middle of the seam with a clean, dry finger. If no adhesive “strings up” or transfers to the finger, the adhesive is ready for the push test. Push sideways on the adhesive. The adhesive film should not move. The adhesive can skin over giving the false impression that it is dry. The base may still be wet, allowing the surface to slide.
- Close the seam by mating both coated surfaces. Roll the assembled seam with a 50 mm wide silicone rubber roller using positive pressure. Roll toward the outer edge of the seam, then along its entire length above the edge. The pressure will strengthen the seam.
- Wait a minimum of 4 hours before sealing the exposed edge with Lap Sealant, to enable the solvents of the adhesive to flash off. If Lap Sealant is applied too soon, the additional solvents of the sealant may swell the sheet putting additional stresses on the freshly installed seam. The edge of the seam should be sealed either before the end of the working day, if inclement weather is threatening or within 24 hours. Clean the edge of the seam where the Lap Sealant is to be applied and apply a 25 mm bead of Lap Sealant, centred above the edge of the seam (coverage rate 6 lm per tube). Feather the Lap Sealant over the edge using the tool provided or install the Lap Sealant directly using the preformed nozzle.

Notes:
- Every detail in the following chapters specified with QuickSeam FormFlash or QuickSeam Flashing materials can be alternatively executed using regular FormFlash and Splice Adhesive provided the above mentioned instructions are followed and the minimum overlap for adhesive seams of 100 mm is respected.
- Regular FormFlash should obligatory be applied using Splice Adhesive. QuickPrime Plus is not sufficient.