3.6 Pipe Penetrations

3.6.1 Penetrations General

This section provides information with regard to detailing around circular and odd shaped roof penetrations.

All penetrations passing through the membrane should be flashed using one of the following techniques:

- QuickSeam Pipe Boot or Conduit Flashing.
- Field fabricated pipe flashing.
- Penetration Pocket.

For re-roofing applications, all existing flashings should be stripped off (i.e. lead, existing roofing membranes, mastic, etc.) prior to installation of the new detail. The flashing seal must be made directly to the penetration.

All pipes must be anchored to the deck, as loose pipes move and may damage the flashing.

All rubber components should be protected from direct contact with steam or heat sources when the in-service temperature of the penetration is in excess of 82°C. In such cases the flashing can be installed directly to an intermediate insulated cool sleeve. Pipe boots and QuickSeam FormFlash require the installation of a rain collar at the sleeve/pipe junction.

In mechanically attached systems a batten layout is required around each pipe penetration. Refer to the details at the end of this document for additional information.

All metal edges used at pipe penetrations must have rounded corners.
3.6.2 QuickSeam Pipe Boot / QuickSeam Conduit Flashing

**Applicability**

The QuickSeam Pipe Boot is designed for circular pipes from 25 to 150 mm in diameter where the top of the pipe is accessible. This technique is not applicable for the following situations: structural steel tubing, multiple penetrations close to one another, when the pipe is too close to the wall, flexible penetrations such as cables, on uneven surfaces, for thin metal stacks or hot pipes. The QuickSeam Conduit Flashing is designed for small pipes from 13 to 65 mm.

![Diagram of QuickSeam Pipe Boot / QuickSeam Conduit Flashing](image)

**Installation Instructions**

Clean the pipe and the field membrane around the pipe (approximately 150 mm) with Splice Wash. If the pipe is rusted or cannot be cleaned with Splice Wash, clean it with a steel brush, then clean with Splice Wash. Select the proper pipe boot size by positioning it on the pipe so it fits snugly. Mark the pipe boot and cut off the top portion just above the sizing ring.

Scrub-apply the QuickPrime Plus around the pipe in square fashion by making four strokes on the four sides of the pipe. Allow the QuickPrime Plus to flash off (5 to 10 minutes). Pull the pipe boot down until the flange lays freely on the base membrane. Remove the backing paper from underneath the flange, smooth the flange first with hand pressure, then roll it with a small 50 mm wide rubber roller. Peel down the top of the pipe boot approximately 25 mm and apply a bead of Lap Sealant around the entire circumference of the pipe. Roll the top of the pipe boot gently back into place. Install the stainless steel clamping ring below the appropriate sizing ring and tighten the locking screw. It is important that the clamping ring seats onto a flattened surface of the boot.
3.6.3 Field Fabricated Pipe Flashing

**Applicability**
This technique applies to circular pipes or supports where the top is not accessible and for accessible pipes larger than 150 mm in diameter. This technique cannot be used for multiple penetrations, flexible conduits, cables, small pipes less than 25 mm in diameter and hot pipes.

Typically the roof membrane has been cut to accommodate the penetration. Before installing the pipe flashing, repair the cut as per Firestone specifications.

**Installation Instructions**
The base flashing of the pipe consists of two identical pieces of QuickSeam FormFlash. The dimensions of the QuickSeam FormFlash pieces are such to provide a base overlap of 75 mm with the field membrane in all directions and a 75 mm overlap between the two FormFlash pieces. This results in an overall dimension of \((150 + \varnothing) \times (75 + (75+\varnothing)/2)\). Pipes larger than 225 mm in diameter require the use of one or two EPDM base pieces, applied with normal seaming techniques.

Apply QuickPrime Plus to the pipe and the base membrane around the pipe in the designated area. Allow the QuickPrime Plus to flash off completely. Apply the first piece of QuickSeam FormFlash and roll it towards the pipe, mark the diameter of the pipe on the back side of the QuickSeam FormFlash and make a horseshoe shape cut ensuring a 25 mm overlap up the pipe.
Remove the protective film and mate the QuickSeam FormFlash without stretching to the primed area. Start at both outside edges, maintaining a straight line. Finally work the QuickSeam FormFlash into the base of the pipe. Apply QuickPrime Plus to the overlapping area and repeat the same procedure for the installation of the second piece forming an overlap of 75 mm minimum. Roll both pieces with a 50 mm wide silicone rubber roller.

Measure the third piece (pipe wrap) of QuickSeam FormFlash. This piece should overlap a minimum of 50 mm onto the base flashing. The appropriate length is determined by the circumference of the pipe plus 75 mm for the overlap. Fold back the wrap piece 50 mm and maintaining the fold, initiate contact at the base of the pipe. Stop when the first third of the piece is adhered vertically around the pipe. Use thumbs and forefingers to work the first part of the fold down and outward. Transfer all the stress in the QuickSeam FormFlash to the outside edge.
Apply QuickPrime Plus to complete the overlap and complete the wrap. Finally, work in the opposite direction to work down the remaining part of the fold. Roll the wrap piece and seal all exposed cut edges with Lap Sealant.

![Diagram](image1)

**Fig. 3.6.7**

### Alternative Detail

The field fabricated pipe flashing can also be executed using two wrap pieces of QuickSeam FormFlash as illustrated. Make sure that the first wrap piece overlaps a minimum of 75 mm onto the field membrane and a minimum of 25 mm onto the pipe. The second wrap piece overlaps a minimum of 50 mm onto this base flashing.

![Diagrams](image2)

**Fig. 3.6.8**

**Fig. 3.6.9**

This technique might be more appropriate for larger pipe penetrations.
3.6.4 Penetration Pocket

- **Applicability**
  Penetration pockets are designed as a last resort for flashing penetrations that cannot be flashed in any other way. This technique applies to clusters of pipes, odd shaped roof penetrations, I-beams, small pipes less than 13 mm in diameter, etc.

- **Installation Instructions**
  In many cases, the field membrane should be cut to work around the penetration. The cut must be repaired as per Firestone specifications. The covering piece must lap a minimum of 75 mm beyond the cut in all directions. The field end of the cut should be rounded to prevent the cut from tearing further during the life of the roof.

  Seal around the penetration prior to installation to prevent Pourable Sealer from flowing into the roof system and possibly into the building. Prime the penetration and the roof membrane with QuickPrime Plus. A QuickSeam Penetration Pocket can be used as long as a minimum clearance of 25 mm between the sides of the penetration and reinforcing ring can be achieved. If a 25 mm clearance cannot be achieved with either a QS6 or QS10 Penetration Pocket, then a field fabricated penetration pocket must be used.

  **Option A: QuickSeam Penetration Pocket**
  Apply QuickPrime Plus to the inside of the reinforcing ring. After the primer has dried, place the plastic ring, centering it around the penetration. Ensure that there is a minimum of 25 mm clearance between the sides of the penetration and the ring to allow for Pourable Sealer. Cut the Pocket along the line provided on the flange and up the side. With the release paper intact, place the pocket around the plastic ring so that the top lip covers the plastic ring. Remove the paper and attach the flange to the membrane. Roll it using a 50 mm wide silicone rubber roller. Repair the cut in the pocket using the QuickSeam Corner Flashing provided in the kit.

  **Option B: Field Fabricated Pocket**
  The flange corners of the penetration pocket must be rounded prior to installation. There must be 25 mm spacing between all penetrations and between each penetration and the side of the penetration pocket. The minimum height of the penetration pocket is 50 mm being the minimum acceptable thickness of Pourable Sealer.

  Measure the four pieces of QuickSeam FormFlash as follows. The length of each piece must cover one side of the penetration pocket plus 150 mm (75 mm for each outside corner). The width will be 75 mm base lap plus metal flange; vertical height and 25 mm to be formed inside the pocket. Install the four pieces of QuickSeam FormFlash with QuickPrime Plus, starting on opposite sides of the penetration pocket. Adhere the 25 mm overhang into the pocket.
Refer to the Product Information Sheet for information with regard to storage, mixing and preparation of the Pourable Sealer material. Use a stick to force the sealant between all penetrations while pouring it into the penetration pocket. Make sure that the sealant is worked between the pipes. Crown the penetration pocket by cresting the sealant in the centre and tapering it to the sides. Cool storage temperatures (below 15°C) may result in a difficult application. Seal all exposed cut edges of the QuickSeam FormFlash with Lap Sealant.