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:
- Pre-Molded Pipe 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 TPO components should be protected from direct contact with steam or heat sources when the in-service temperature of the penetration is in excess of 60ºC. In such cases the flashing can be installed directly to an intermediate insulated cool sleeve.

All metal edges used at pipe penetrations must have rounded corners.

3.6.2 Pre-molded Pipe Flashing

- Applicability
  Firestone UltraPly™ TPO Pipe Flashings are specifically designed to be used in roofing applications for flashing of round penetrations.

  The Universal Pre-molded Pipe Flashing is designed for circular pipes from 25 to 152 mm in diameter where the top of the pipe is accessible. The Large Pre-Molded Pipe Flashing is designed for circular pipes from 106 to 203 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.

- Installation Instructions
  Clean the pipe and the field membrane around the pipe (approximately 150 mm) with Splice Wash if the seam area has become heavily contaminated with dirt, debris, mud, etc.. If the pipe is rusted or cannot be cleaned with Splice Wash, clean it with a steel brush, then when possible with Splice Wash.

  Each pipe boot will fit various penetrations and shall be cut at the correct place to insure a tight fit before installation. Select the pipe boot size that corresponds to the outside diameter of the penetration to be flashed. Cut out a circle on the outside of a level ring of the pipe boot that is smaller than the penetration.

  Cut the extra material from the pipe boot base around the indented circle. Heat weld the boot into place and install the clamp and sealant per current UltraPly TPO specifications.

  Install the stainless steel clamping ring and tighten the locking screw. It is important that the clamping ring seats onto a flattened surface of the boot. Finish by applying a bead of General Purpose Sealant around the entire circumference of the pipe.
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 203 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.

In many cases, the field membrane should be cut to work around the penetration. The cut must be repaired prior to installation pipe flashing. The covering piece must lap a minimum of 75 mm beyond the cut in all directions.

- Installation Instructions
Refer to the illustrations at the end of this document for additional information.

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 25 mm in diameter. Up to a pipe diameter or cluster of 90 mm a pre-molded TPO Penetration Pocket can be used, for larger openings a pocket can be made out of TPO coated metal.

- Installation Instructions
Seal around the penetration prior to installation to prevent Pourable Sealer from flowing into the roof system and possibly into the building.

In many cases, the field membrane should be cut to work around the penetration. The cut must be repaired prior to installation of the penetration pocket. The covering piece must lap a minimum of 75 mm beyond the cut in all directions.

Option A: Pre-molded TPO Penetration Pocket
Open the PVC ring and place it around the penetration. If required, cut the TPO Penetration Pocket through the flange and side in one place and install it over the PVC ring so that the ring fits completely inside the top overhang of the pocket. Then cut a piece of TPO flashing long enough to cover the cut in the pocket and the membrane. Heat weld the flashing on the vertical cut in the pocket and to the lip in the cavity. Center the pocket around the penetration and weld the flange to the membrane. Next, weld the flashing onto the flange and cut membrane. Weld and roll the flange step-off thoroughly.
Option B: Penetration pocket using TPO Coated Metal

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. Secure penetration pocket as per base tie-in detail and flash per Firestone details. Refer to the illustrations at the end of this document for additional information.

Apply the TPO QuickPrime with the dauber to all areas of the penetration and all surfaces that the pourable sealer will contact within the cavity. Make sure that the top of the pocket is primed also. Allow the primer to dry and add pourable sealer, being careful to mound it from the penetration to the top of the pocket to shed water away from the penetration. Refer to the product information sheet for information with regard to storage, mixing, preparation and application of the Pourable Sealant 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.

Refer to the illustrations at the end of this document for additional information.