EPDM

RESIDENTIAL INSTALLATION HANDBOOK

EPDM Membrane Low-Slope Roofing System
For projects under 1000 sq. ft.

MULE-HIDE PRODUCTS®

Mule-Hide

EPDM Membrane Residential Low-Slope Roofing System Installation Handbook

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Now that you've selected one of the best Low-Slope Roofing Systems available today, please take the time to read through this installation handbook carefully before beginning. The handbook is broken into sections to help simplify the installation of the Mule-Hide EPDM Roofing System.

Safety First

1. First and foremost, do not smoke in the vicinity of the materials being installed. Some of the products that may be used contain solvents. Material Safety Data Sheets (MSDS) are available upon request from your local distributor.

2. Please remember that these are commercial grade products. Read the labels on each product prior to using.

3. Always make sure any ladders being used are securely tied off and take the time to be aware of the surrounding area when on a roof. When near the edge of a roof, always work facing the edge, not with your back to it. Make sure power cords are positioned to minimize the chance of tripping over them.

4. Do not use open flames to accelerate the drying of any products. These products must air dry on their own.

5. Make sure that all nearby windows, doors and air intakes are closed prior to working with solvent-based adhesives. The vapors are heavier than air and will travel across the roof and down into openings beside, on, and under the roof surface. When working with solvent-based products, make sure solvent-resistant gloves are worn to protect hands and skin. Follow guidelines in the MSDS sheets for the product being used.

Material Storage

1. Keep all adhesives, sealants, primers and cleaning material away from all ignition sources (i.e., fire, sparks, and flames). Maintain proper ventilation when storing materials in an enclosed area or building.

2. Always store materials in their original containers as labeled by the manufacturer. Follow manufacturer's directions for proper protection of materials prior to and during installation.

3. Read all container labels for additional information on application and storage. Keep all containers tightly closed when not in use.

4. Dispose of materials and their containers in accordance with local, state, and federal government regulations.

General Precautions

1. The **first rule** of thumb is **"Do not use petroleum-based products such as roof cement or asphalt-based roof coatings with the EPDM membrane or its accessories."** Asphalt-based products are not compatible with EPDM products.

2. Make sure all surfaces where products will be applied, such as tapes, adhesives, caulk, primer, or cleaners, are dry and free of dirt and debris. If any areas are cleaned with soap of any type, rinse thoroughly. Dried soap film will act as a release agent. The **second rule** of thumb is **"Do not install the new EPDM Roofing System over wet materials."** All materials must be thoroughly dry prior to installing the EPDM membrane.

3. Never work alone.

4. The EPDM membrane can become slippery when wet or if frost occurs on the roof surface.

5. Be careful when working in weather below 50 degrees F since adhesives, primers, and cleaners will not dry as quickly as in ambient temperatures with the sun shining. When using solvent-based products, if condensation begins to form on the surface, work must be halted until the weather warms sufficiently to evaporate the moisture. Adhesives will require a second coat if this occurs.

6. When using **Mule-Hide's Water Base Bonding Adhesive**, the **temperature should not drop below 45 degrees for 48 hours** after application. Do not let the Water Base Bonding Adhesive freeze.

7. Do not attempt to thin any of the liquid products. Keep the lids on when not actively in use. Make sure all products are stored in their original containers in a cool, dry area.

8. Be careful when installing fasteners through the deck. Make sure there are no wires, conduit, or piping that may be penetrated when installing the fasteners.

PRE-INSTALLATION INFORMATION

Getting Started

TOOLS YOU WILL NEED:

1. Following is a list of power and hand tools that are typically needed to install an EPDM Roofing System:

   a. Ladder
   b. Electrical extension cords
   c. Heavy duty scissors
   d. Hammer and pliers
   e. Markers (crayon or pen)
   f. Clean rags
   g. Measuring tape
   h. 2-inch wide steel roller
   i. Screw gun or drill with Phillips bits (# 2 & # 3)

j. Screw drivers (Phillips and Straight)
k. Utility knife and blades
l. Caulking gun
m. Chalk line
n. Scotch-Brite® pads
o. 9-inch and 3-inch paint rollers and covers
p. Tin snips and hack saw

2. It is strongly recommended that any old roofing system be removed to the deck. The deck should be inspected for water damage. Any wood showing signs of warpage or rotting should be removed and replaced with new material. The new Mule-Hide EPDM Roofing System will be attached or adhered to the deck and is dependent on the deck being dry and in good, sound condition. Special tools may be rented from the local tool rental facility to aid with the tear-off of the old roof. It may be necessary to rent a dumpster to dispose of the old roofing materials.

3. Remember to check with the local building inspector for any required permits or general requirements necessary for the new roofing system to be in compliance with current local building codes.

Roof Drainage

1. Long-term performance of any roofing system may be affected by **ponding water**. Ponding water is a condition where water remains on the roof for more than 48 hours after a rain.

2. Mule-Hide recommends a minimum 1/4 inch per foot roof slope to assure proper drainage and to maintain the integrity of the new roofing system.

Decking Requirements

For most residential and small commercial roofing projects, wood is the most common deck material. For the purpose of this manual, Mule-Hide will only address plywood and wood plank decks. Should you encounter either a steel or concrete deck, please contact Mule-Hide's Customer Support Line at 1-800-786-1492.

Insulation and Attachment

If adding insulation above the deck, prior to applying the EPDM membrane, there are several generic insulations available to choose from that are typically used with this type of roofing membrane.

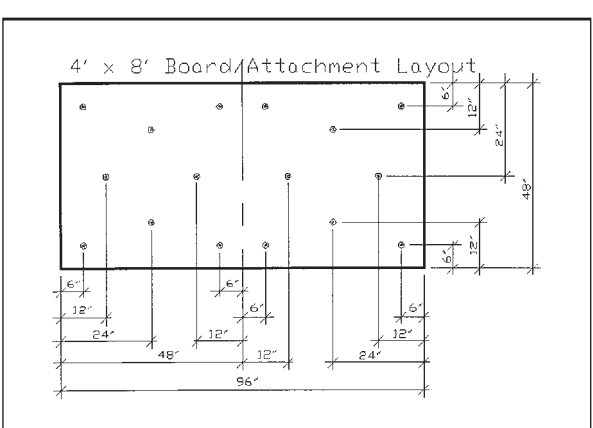


Illustration "A"

1. **High Density Wood Fiberboard** - This is the most common product installed over wood decks. While the insulating value is minimal, it provides a smooth surface to adhere the membrane. It also provides a good barrier to prevent nails from backing out of the deck and puncturing the membrane. There are two types of wood fiberboard. The type used with the roofing application must be the high density version. It is available in thicknesses of 1/2-inch and 1-inch with sizes of 4' x 4' and 4' x 8'. Standard attachment is with 3-inch diameter metal insulation plates and #12 deck fasteners at a rate of 1 fastener/plate for every 2 square feet. For a 4' x 4' board this would equate to 8 fasteners and for a 4' x 8' board, 16 fasteners/plates would be used. (see Illustration "A".)

2. **Polyisocyanurate** - This is a type of foam and probably the second most popular insulation used with single-ply membranes. It has a black felt facer on the top and bottom sides of the board. It is usually mechanically attached to the roof deck with deck screws and 3-inch diameter insulation plates. The plates and fasteners are normally installed at a rate of 1 fastener/plate for every 2 square feet of roof surface. More simply stated, it would require a minimum of 8 fasteners/plates for an insulation board 4' x 4' or 16 fasteners for an insulation board 4' x 8'. (see Illustration "A".) This board is typically a minimum of 1 inch thick. It is available either as flat stock or tapered.

3. **Expanded Polystyrene** (also known as

EPS) - This is also a type of foam, white in color, that does not usually have a facer as does polyisocyanurate. This product is available in various thicknesses and sizes, most typically 4' x 4' and 4' x 8'. As this product does not have a facer, a layer of high density **must** be installed over top for fully adhered and mechanically attached applications. For roofing applications, generally, a board rated at a minimum 1-pound density is required. This product is available as either flat stock or tapered. Mechanical attachment of the insulation is the same as listed for high density wood fiberboard as a layer of wood fiberboard is **required** over the EPS product.

4. Once a board has been selected, make sure the boards are protected from the weather until the time of the installation. Any wet insulation should be replaced prior to installation.

5. All insulation should be fitted tightly together and mechanically attached to the roof deck as indicated above. Any gaps greater than 1/4 inch wide should be filled with insulation. Multiple layers should have the joints of the second layer staggered from those of the first layer.

After installing the insulation, the procedures for the application of the EPDM membrane and the details are the same whether insulation is installed or not.

Product Information

1. **STANDARD BLACK EPDM MEMBRANE –** Mule-Hide's Standard Black EPDM Membrane is a high performance, non-reinforced membrane that stands up to tearing, impacts, punctures and normal roof traffic. The elastomeric properties of the EPDM membrane compensate for thermal shock and building movement. EPDM membranes provide excellent resistance to ozone and aging. The membrane is manufactured in accordance with the guidelines established by the RMA (Rubber Manufacturers Association) and meets all government specification as well as the ASTM Standard Specification D-4637. The membrane comes in thicknesses of .045" and .060" and widths of 10 and 20 feet.

2. **RMS STRIPS WITH TAPE –** Mule-Hide's Reinforced EPDM membrane strips (RMS) are 6-inch wide by 100 feet long, with a 3-inch wide Butyl Tape laminated to one-half of the strip. The RMS strips with 3-inch tape are used in conjunction with Mule-Hide's 2-inch Barbed Seam Plates and fasteners as a method of securement of the EPDM membrane at the base of parapet (vertical) walls, curbs, and shingle tie-ins. The RMS Strip with 3-inch Tape is installed beneath the EPDM field sheet.

3. **3-INCH IN-SEAM TAPE –** Mule-Hide's In-Seam Tape was specifically developed for seaming sheets of EPDM membrane together. The In-Seam Tape is a black, butyl rub-

ber-based adhesive in a tape form. The product has been formulated to provide excellent adhesion. The 3-inch In-Seam Tape product should be used in conjunction with Mule-Hide's Tape Primer.

4. **SINGLE SEAL ADHESIVE –** Mule-Hide's Single Seal Adhesive may be used as either a splice or bonding adhesive. The product is a premium grade brush or roller applied **contact** adhesive. This adhesive produces strong bonds that are resistant to moisture, oil, and grease. The Single Seal Adhesive bonds EPDM to metal, wood, concrete, and approved insulation boards.

5. **WATER BASE BONDING ADHESIVE –** Mule-Hide's Water Base Bonding Adhesive is an acrylic latex-based adhesive with superior bonding performance. The product is white in color and is clear when dry. This product can be used as a single-sided adhesive when applied over porous surfaces such as plywood, OSB, wood and high density wood fiberboard insulation. When applied as a single-side adhesive, the EPDM membrane may be moved and adjusted to remove any wrinkles. Working time before set-up takes place is approximately 20 minutes. As this product is water based and contains no solvents, actual drying time is dependent on temperature and humidity. **NOTE: Can be used as single-side adhesive on <u>Horizontal</u> surfaces only. On <u>Vertical</u> surfaces, this product must be used as a contact adhesive.**

6. **TAPE PRIMER –** Mule-Hide's Tape Primer is

a solvent-based cleaner specifically formulated to clean and prime EPDM membrane. Tape Primer is **required** to be used prior to the application of In-Seam Tape, Corner Patches, and Pre-Manufactured Pipe Boots with Tape.

7. **BLACK LAP SEALANT –** Mule-Hide's Black Lap Sealant is a one-part elastomeric sealant designed for sealing the exposed edges of EPDM membrane laps, inside and outside corners and in certain applications of terminations.

8. **WATER CUT-OFF MASTIC –** Mule-Hide's Water Cut-Off Mastic can be used to seal roofing membranes to stop water penetration into the roofing system. Common uses are as a drain sealant and behind Mule-Hide's All Purpose Bar at wall and drip edge terminations.

9. **PRE-MANUFACTURED PIPE BOOTS WITH TAPE –** Mule-Hide's Pre-Manufactured Pipe Boots with Tape are economical pre-fabricated flashings designed for single pipe penetrations. These boots will accommodate single pipe sizes from 1 inch to 6 inches in diameter. With their conical-shaped steps, the pipe boots will securely seal all single pipe penetrations. The large, double-thick, molded rib at the top of each step offers superior tear-resistance and reinforcement, as well as a cutting guide. The pre-installed Tape Ring makes it simple to adhere to the EPDM membrane after the application of Tape Primer.

10. **3-INCH METAL INSULATION PLATES** Mule-Hide's 3-inch Metal Insulation Plates are used specifically for the mechanical attachment of approved insulation boards to acceptable roof decks. The plates are made of Galvalume™ metal and have reinforcing ribs for added strength.

11. **2-INCH BARBED SEAM PLATES –** Mule-Hide's 2-inch Barbed Seam Plates are used to mechanically attach the RMS Strip with Tape. The plates are made of Galvalume™ metal and have barbed anchors and reinforcing ribs for superior uplift resistance.

12. **ALL PURPOSE BAR –** Mule-Hide's All Purpose Bar is a specially extruded aluminum bar without sharp edges. This bar is designed for use as an anchor bar for the termination of the EPDM membrane in drip edge and wall termination details.

13. **PRE-CUT CORNERS –** Mule-Hide's Pre-Cut Corners are economical pre-fabricated flashings, which can be used to field flash inside and outside corners on an EPDM roof. The Pre-Cut Corners are 7 inches wide by 9 inches long, and are composed of .060-inch thick uncured EPDM laminated to a butyl tape. The uncured state of these patches allows for easy molding around corners. Mule-Hide's Tape Primer must be used in conjunction with this product.

Estimating Guidelines

The following information should be used to determine the amount of materials needed for your projects.

Membrane:

Measure the length and width of the area to be covered. Be sure to include any vertical walls or shingle tie-ins. **Rule of Thumb: After measuring add 1 foot to the width and 1 foot to the length. This will allow for any shrinkage or drip edge terminations.** Your distributor can then suggest the proper size cut of membrane for your project.

Accessory Items:

RMS Strip with 3-inch Tape – Strips are 6 inches wide by 100 feet long.

3-inch In-Seam Tape – Available in rolls 100 feet long.

Single Seal Adhesive – Used as a contact adhesive (two-sided application), coverage is 50 square feet per gallon (finished). Available in 1-gallon pails.

Water Base Bonding Adhesive – Can be used as single-side application on horizontal surfaces. Coverage is 100 – 120 square feet per gallon. If used as a contact adhesive in vertical applications, finished coverage is 50 – 60 square feet per gallon. Available in 1-gallon containers.

Tape Primer – Coverage of 200 linear feet per gallon. Packaged in 1-gallon cans.

Black Lap Sealant – One 11-ounce tube will do 20 linear feet.

Water Cut-off Mastic – One 11-ounce tube will do 20 linear feet.

Pre-Manufactured Pipe Boots with Tape – One boot needed per penetration.

All Purpose Bar – Available in 10-foot long pieces.

Pre-Cut Corners – 7-inch by 9-inch pieces. Can be purchased separately.

3-inch Insulation Plates – If insulation will be needed for the project, plan on 1 insulation plate for every 2 square feet.

2-inch Barbed Plates – Must be used to attach the RMS Strip with Tape at the base of any wall, curb, or shingle tie-in. Plan on 1 plate per linear foot for the attachment of the RMS Strip with Tape.

INSTALLING THE ROOFING SYSTEM

Preparing the Deck

1. Once all the old roofing materials have been removed, inspect the deck carefully. Make sure all decking is solid, dry, tightly fitted and properly secured to the joists. Any wet or warped boards should be removed and replaced with new material of like quality and type.

2. Plywood and plank decks

   a. Remove all debris and old roofing materials, and sweep the deck clean.

   b. Thoroughly check the deck to make sure the planks or plywood sheets are properly secured. If the deck has been secured with nails, it is generally recommended

that a minimum layer of 1/2-inch thick, high density wood fiberboard be installed over the deck before adhering the membrane. It is not required, just a recommendation.

c. If adding insulation thicker than 1/2-inch high density wood fiberboard, it will be necessary to install a wood nailer around the perimeter of the roof surface. The wood nailer should be the same height as the thickness of the insulation. If there are parapet walls or the roof abuts a wall, wood nailers are not required. Wood nailers are primarily installed to protect the insulation and provide a hard material to which the metal edging may be anchored.

RMS Strip with Tape

Prior to installing the EPDM sheet, Mule-Hide's 6-inch wide RMS Strip with Tape shall be installed at the base of any walls, parapet walls,

Figure 1

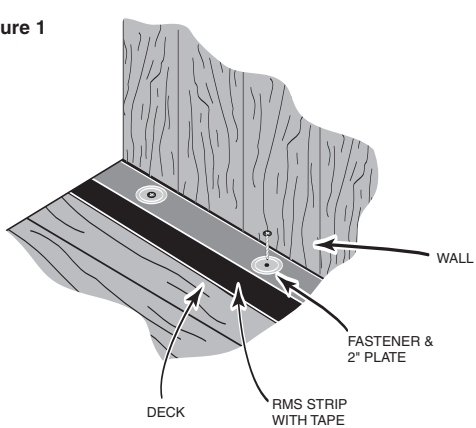
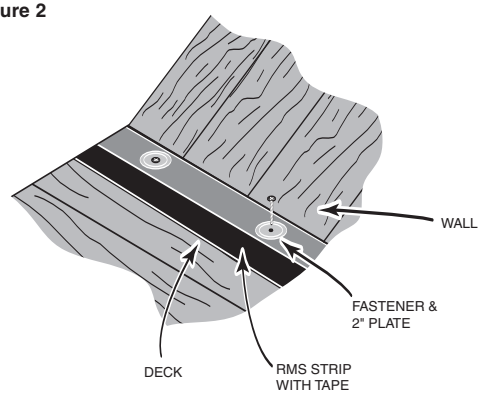


Figure 2



curbs, or shingle tie-ins. The RMS Strip is a reinforced EPDM strip that has a 3-inch wide butyl tape laminated to one side. The pre-applied tape helps speed up and simplify the installation process.

1. The RMS Strip is laid tight to the base of the vertical surface, either a parapet wall, curb, or wall. Adjoining RMS Strips must be spaced a maximum of 1 inch apart. It is not necessary to overlap the RMS Strips. The RMS Strip is installed a minimum of 6 inches from any inside or outside corner. The RMS Strip is installed with the tape facing up and away from the base of the vertical surface. The RMS Strip is attached to the roof deck with Mule-Hide Fasteners and 2-inch diameter Barbed Seam Plates. (see Illustration “B”.)

2. The 2-inch Barbed Seam Plates are positioned 12 inches on center starting 1 inch in from the end of the strip and approximately 1/2 inch out from the base of the vertical surface. This will ensure that the tape strip is

attached in the right area. This will allow for 3 inches of RMS Strip that will be continuously spliced to the field sheet. **Do not** put the plates over the tape laminated to the RMS Strips. The 2-inch Barbed Seam Plates will be attached to the deck with the appropriate Mule-Hide Fasteners.

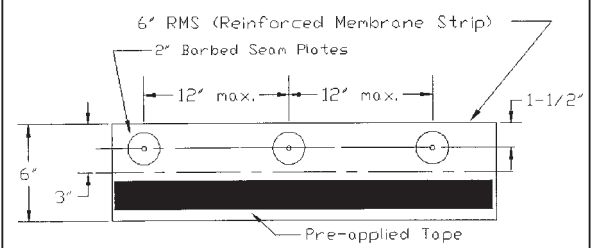


Illustration "B"

3. After the RMS Strips have been attached to the roof deck, position the field sheet to allow enough membrane to flash the vertical surface to the point of termination. Once the EPDM sheet is adhered to the roof surface, the EPDM sheet is rolled back to expose the RMS Strip. The EPDM sheet is cleaned with Mule-Hide Tape Primer, allowed to dry, and folded back over the RMS Strip.

4. As the sheet is rolled over the tape, pull the release liner off the tape. Let the sheet lay down on its own. Once in place, take the 2-inch steel roller and thoroughly roll the seam, first going across the seam with over lapping strokes and then along the length of the seams.

Please remember that the EPDM sheet must be fully adhered to the substrate prior to seaming the sheet to the RMS Strip.

The EPDM Membrane

If the project is small and only one sheet of EPDM membrane is needed, lay the membrane on the roof deck (or insulation) and let the membrane relax for about one-half hour. Once the membrane has relaxed, move the membrane into to its final position.

While the sheet is relaxing is a good time to get the adhesive stirred and placed on the roof as well as gathering up the tools needed to apply the adhesive. 9-inch wide roller handles and roller covers should be used to apply and spread the adhesive. Using a broom handle attached to the paint roller will help speed up the application process.

1. Adhesive application
   a. After letting the sheet relax, fold the membrane in half. Do not worry about the talc on the sheet.

   b. When applying the EPDM membrane over plywood, OSB or High Density Wood Fiberboard, the best adhesive to use is Mule-Hide's Water Base Bonding Adhesive.

   c. Mule-Hide's exclusive Water Base Bonding Adhesive may be used in a "single sided application" (on horizontal surfaces only). In other words, the

adhesive is applied only to one surface (in most cases, the substrate). The membrane is immediately rolled into the wet adhesive and then broomed with a nylon push broom to ensure the surfaces have mated properly.

d. Typical application rates for adhering the EPDM membrane to a plywood or plank deck is about 120 square feet per gallon. Application to high density wood fiberboard is about 100 to 120 square feet per gallon. This may vary due to the porosity of wood fiberboard being different from manufacturer to manufacturer. The Water Base Bonding Adhesive should not be used on roof slopes greater than 2 inches per foot. The membrane can slide underfoot while the adhesive is drying.

Note: This manual will cover the application of the Water Base Bonding Adhesive. For instructions on the use of Single Seal Adhesive for horizontal surfaces, contact Mule-Hide's Customer Support Line, 1-800-786-1492.

e. After the sheet has been folded in half, check to make sure the sheet is still aligned properly.

f. Stir the Mule-Hide Water Base Bonding Adhesive prior to application. Apply the adhesive starting at the fold and working away from the center. Using a 1/2-inch thick nap roller cover, apply a coat thick

enough to provide a uniform, **white** surface (about the thickness of a dime). Cover the substrate until it is white in color and the grain of the plywood or the black surface of the insulation is no longer visible. The adhesive is similar in consistency to a thick, latex paint. Do not leave any bare spots on the substrate.

g. Only coat as much substrate as you can lay membrane within 5 minutes of applying the adhesive. The key to successful installation of the membrane is to lay the membrane into the Water Base Adhesive as soon as possible. Do not let the adhesive set and begin to flash off (dry). The Water Base Adhesive must be "wet" as the membrane is laid into the adhesive. If the Water Base Adhesive begins to turn clear, add another coat of adhesive to the substrate.

h. Continue this process working to the end of the roof. Once the membrane is laid into the adhesive, broom the membrane with a stiff bristled nylon push broom.

i. Fold back the remaining half of the sheet and repeat this procedure to install the second half of the membrane.

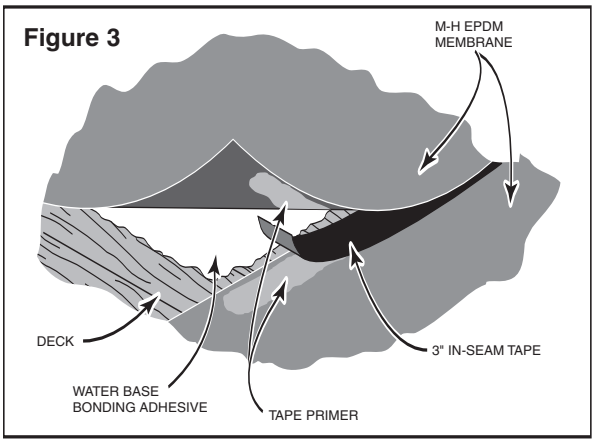
j. Mule-Hide recommends periodically checking the adhesive application rate. Immediately after a sheet has been broomed, gently pull the sheet back 1 to 2 feet and examine the surface of the membrane. A uniform coat of adhesive

should be visible on the surface of the membrane. This indicates that a sufficient amount of adhesive was applied and the sheet was rolled into the adhesive at the right time. Lack of adhesive on the membrane indicates either not enough adhesive is being applied to the substrate or waiting too long to lay the membrane into the adhesive. The porosity of the substrate or climatic conditions may require a heavier coat of adhesive.

Seaming

When using more than one sheet of EPDM, the sheets must be attached together by a method known as seaming. (see Figure 3.) The most common method today is with the use of In-Seam Tapes and Tape Primer. In-Seam Tape is available 3 inches wide and 100 feet long. The tapes have a clear plastic release liner to ease installation. Using Tapes shortens installation time, reduces workmanship problems due to inconsistent product application, allows for more accurate material take-offs, and reduces waste and disposal problems. **Mule-Hide provides a Tape Primer that must be used when installing the In-Seam Tape.**

1. When laying out the EPDM sheets, allow for a 3-inch wide overlap. Make sure the sheets are lapped so that the membrane to the high side of the roof overlaps the membrane to the lower side of the roof. This will allow water to run over the seam and not into the seam - often referred to as “shingling the seams.”



2. After folding back the top sheet, prepare each surface of the seam by scrubbing, using a circular motion, with Mule-Hide's Tape Primer and either clean cotton rags or Scotch-Brite, pads. The Scotch-Brite, pads are preferred for the application of the Tape Primer. Remember to replace the pads or rags with new ones once they become soiled. **Remember:** Both the underside of the top sheet and the topside of the bottom sheet must be scrubbed with the Tape Primer.

3. Once the Tape Primer has dried, roll the top sheet back over the bottom sheet to allow for proper placement of the guide marks. Using a marking pen or lumber crayon, place guide marks on the bottom sheet approximately 1/2 inch away from the edge of the top sheet. This will allow 1/8 inch to 3/8 inch of In-Seam Tape to be exposed along the completed seam. Marks should be placed about every 3 feet along the length of the seam. Do not use a chalk line or any type of marker that will contaminate the Tape Primer and prevent the In-

Seam Tape from adhering to the membrane.

4. After marking the seam, fold back the top sheet. Unroll 2 to 3 feet of the In-Seam Tape leaving the release paper in place. With the exposed side of the tape facing down, roll out the In-Seam Tape along the length of the seam aligning the edge of the release paper with the guide marks. Using a 2-inch wide steel roller, roll the tape with overlapping strokes along the entire length of the seam. If more than one roll or piece of tape is needed to complete the seam, the tape sections must overlap a minimum of 1 inch.

5. Fold the top sheet back over the tape. Peel the release paper off the tape at a 45-degree angle, parallel with the roof surface, allowing the top sheet to fall freely onto the exposed tape. Using light hand pressure, brush from the inside outward over the edge to remove any air pockets. Using a 2-inch wide steel roller, thoroughly roll perpendicular to the width of the tape the entire length of the seam using overlapping strokes and then run the roller along the length of the seam. Lap Sealant is only required at the intersections of factory seams, where two pieces of tape overlap within the seam, where two seams cross each other and around flashing patches.

Vertical Parapet / Wall Flashings and Details

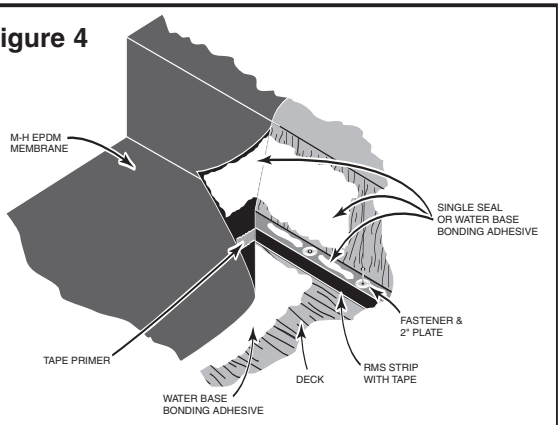
After the EPDM membrane has been spliced to the RMS Strip, the EPDM membrane must then

be bonded to the vertical surface with Mule-Hide's Single Seal Adhesive or Mule-Hide's Water Base Bonding Adhesive. **You must use** these adhesives as a contact adhesive when adhering to **vertical** surfaces. When used as a contact adhesive, both surfaces to be bonded together must be coated the adhesive. (see Figure 4.)

1. Apply the adhesive by roller to the vertical surface and then to the EPDM membrane. Since it is a contact adhesive, 100% coverage of both the substrate and membrane is required. Depending on the porosity of the vertical surface, a heavier application on the vertical surface may be necessary.

2. The adhesive should be allowed to dry until

Figure 4



tacky to the touch but does not string, stick to, or move when pressed with a finger.

3. After the adhesive has flashed off, gently roll the membrane up the vertical surface, starting at the middle of the sheet, working up

and out to the ends. Do not try to work too much membrane at any one time or force or stretch the membrane as wrinkles may occur. The membrane will be rolled up to the point of termination or up and across the top of the parapet and turned down the outside.

4. Carefully broom or roll the vertical surface to ensure secure contact of the membrane. If the membrane is not intended to completely cover the vertical surface, Mule-Hide recommends the membrane should be run vertically, at least where possible, a minimum 8 inches or above anticipated snow, water or ice levels.

5. Do not cover weep holes or thru-wall counterflashings. All vertical flashings must be terminated at the top of the flashing following one of Mule-Hide's details as outlined below.

Curb and Other Vertical Flashings

Flashing curbs and other similar features having vertical surfaces is quite similar to flashing a wall or a parapet wall. Mechanical attachment at the base is required. This is accomplished with the installation of the RMS strips as shown in Figure 4.

The EPDM field sheet should be cut so that the membrane will turn up the vertical surfaces to the point where it will be terminated. When cutting the EPDM membrane to go around a curb, it will be possible to cut the sheet so that the EPDM membrane can roll up two sides of the curb (opposite each other). Two additional

pieces of membrane will have to be cut to do the remaining two sides. Cut the cured membrane to be used to flash the vertical surface to the size needed, allowing for a minimum of 3 inches out onto the field of the roof and 3 inches around each corner. Mule-Hide requires all seams to be a minimum of 3 inches wide.

1. Once the EPDM has been cut to fit around the base of the curb, adhered to the roof surface, and seamed to the RMS Strips, use the Single Seal Adhesive or Water Base Bonding Adhesive to adhere the EPDM to the sides of the curb.

2. Apply adhesive to both the side of the curb and to the EPDM. Allow the adhesive to dry until tacky to the touch but will not come off on your hand. Do not apply adhesive to areas that will be seamed together. Only apply the adhesive to the bare substrate and corresponding membrane.

3. Roll the rubber up the two sides of the curb and using a 2-inch wide steel roller, roll the EPDM tight to the curb to ensure proper adhesion.

4. Take the two cut pieces for the remaining two sides and apply Tape Primer along the length of one side of each piece and across both ends. Also apply Tape Primer across the base of the two sides of the curb without rubber turning the corner - about 3 to 4 inches. Apply Tape Primer to the vertical sides of the curbs from the edge to 3 inches in from each corner. Allow to dry.

5. After the Tape Primer has dried, apply strips of the In-Seam Tape along the base of the curb extending about 1 inch past each corner. Install strips of In-Seam Tape vertically up the corners on the adjoining sides. Roll thoroughly with the steel roller. Remove the plastic release liner from the tape at the base of the curb. Take and cut small pieces of the release liner and apply them over the In-Seam Tape that protrudes past the corners. These will be removed later.

6. Position the primed, cut the EPDM so it covers the In-Seam Tape leaving about 1/8 inch of tape exposed along the edge. Thoroughly roll the membrane with the steel roller.

7. Fold the membrane back and apply the adhesive to both the sheet and the curb and allow to dry until tacky to touch (about 10 to 15 minutes). **Do not** apply adhesive to the ends where Tape Primer was applied.

8. When the adhesive is ready, roll the membrane up the curb and use the steel roller to roll the entire side of the curb. Take the scissors and cut the membrane on a 45-degree angle from the edge of the piece, about 3 inches up the curb, cutting down into the corner at the base. Make a second cut across the bottom of the sheet cutting off the excess sheet extending past the corner. The cut should be flush with the corner leaving the tape extending past the corners exposed. This will leave an “ear” of loose EPDM membrane extending past each corner. Remove the release liner from the vertical strips on each end of the curb and turn the piece (ear) around the corner pressing the sheet firmly onto the tape.

9. Remove the small pieces of release liner that cover the ends of the tape. The membrane at the top of the curb can be nailed off with roofing nails spaced 4 to 6 inches apart.

10. The final step will be to install a Pre-Cut Corner at the base of each corner of the curb.

Outside Corners

The final step to sealing the curb is to flash the outside corners. This is completed with Tape Primer and a 7-inch by 9-inch Pre-Cut Corner. It is allowable to cut the Pre-Cut Corners in half for this application. Each piece will then be 4-1/2 inches by 7 inches. (see Figures 5-1, 5-2, and 5-3.)

1. Using the Tape Primer, clean and prime both sides of the corner approximately 6 inches in each direction from the corner. While the Tape Primer is drying, remove the blue poly film and the release liner from the Pre-Cut Corner.

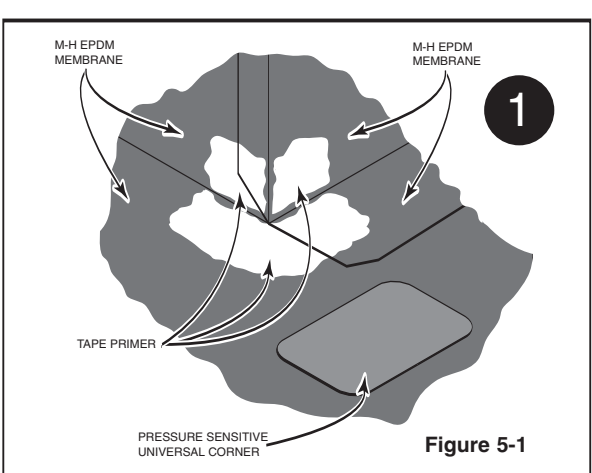


Figure 5-1

2. When the Tape Primer has dried, take the Pre-Cut Corner, fold in half, with the fold facing down and the bare tape facing the curb and apply the corner to the vertical surface of the curb so that it wraps each side of the corner about 3 inches. Press tightly in place.

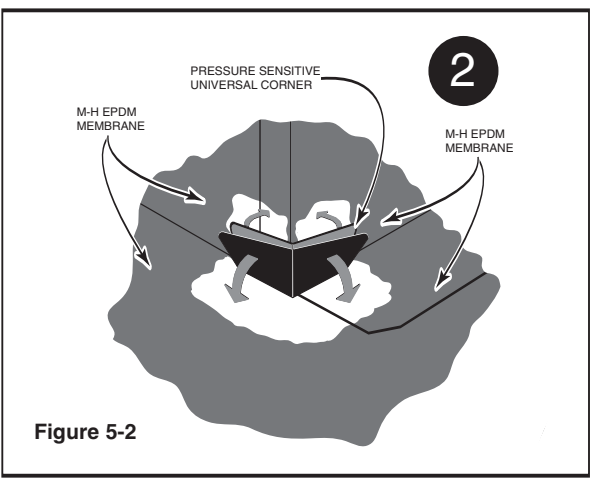
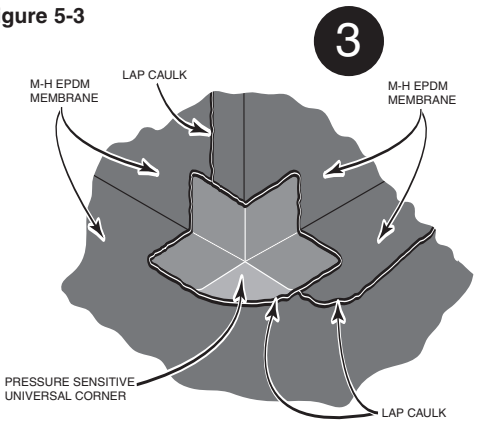


Figure 5-2

3. Remove the remaining release paper and form the flange out onto the horizontal surface by starting in the middle. Gently stretch the material so that the flashing can turn down onto the roof sheet without wrinkling and press into place. There should be no bridging in the corners or wrinkles. In colder weather, it may be necessary to warm the Pre-Cut Corner with a hot air gun to soften the material to allow for forming.

Figure 5-3

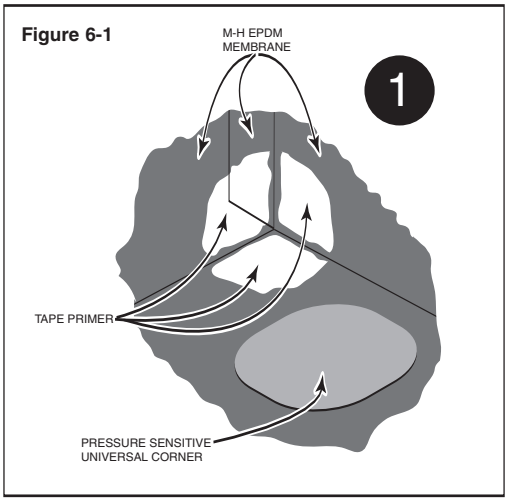


Repeat the same procedure with each outside corner. After about two hours or at the end of the day, apply a bead of Lap Sealant to all flashing edges. Again, it is not necessary to trowel or feather the Lap Sealant. Each corner should be completed in this manner.

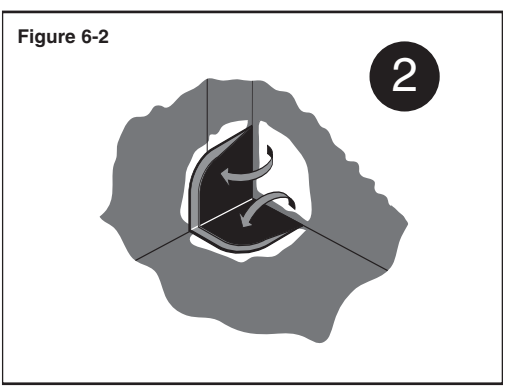
Inside Corners

When flashing vertical surfaces you may also have an inside corner to complete. Inside corners may be completed using the **full** pieces of the Pre-Cut Corners. (see Figures 6-1, 6-2, 6-3, and 6-4.)

1. Using the Tape Primer, prime each side of the inside corner at least 12 inches in all directions. While the Tape Primer is drying, remove the blue poly film and the release liner from **half** of the Pre-Cut Corner. Fold the corner in half with the exposed tape facing down.

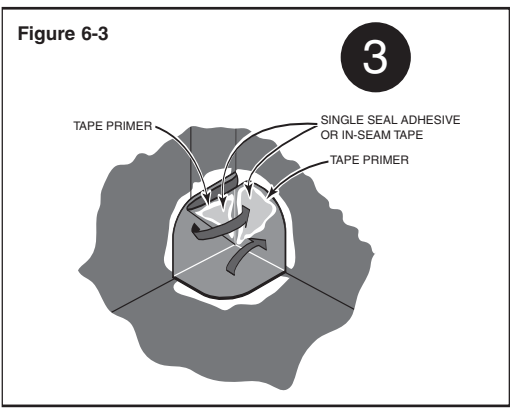


2. Position this piece in the corner so that the midpoint of the fold is tight to the corner with 4-1/2 inches extending up and 4-1/2 inches out onto the roof surface. Press into place. Remove the remaining release liner working the bottom half of the fold up the side of the wall. This will form a fold that is commonly referred to as a pig's ear. Press the fold together.



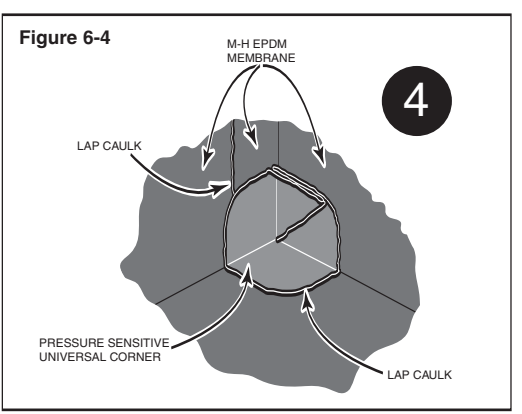
3. Apply Tape Primer to the fold and to the surface to which the fold will be adhered. When dry, cut a piece of 3-inch wide In-Seam Tape the length of the fold. Fit the tape between the pig's ear and the vertical wall. Remove the release liner and press the fold tight to the wall. Roll with a 2-inch steel roller.

Figure 6-3



4. After about 2 hours or at the end of the day, apply Lap Sealant to all of the exposed edges. Do not trowel or feather the Lap Sealant.

Figure 6-4

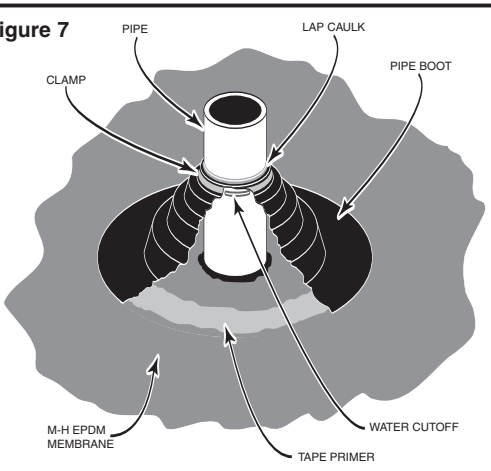


Pre-Manufactured Pipe Boots with Tape Ring

Pre-manufactured Pipe Boots are designed and tapered in such a way that one pipe boot size will fit pipes ranging from 1 inch to 6 inches in outside diameter. The bottom of the flange of the boot has a layer of pressure sensitive tape with a release liner that eliminates the need to use adhesive. Whether new construction, reroofing, or a recover application, be sure to remove all existing pipe flashings of any type. (see Figure 7.)

1. To install a pipe boot, first fit the boot over the top of the pipe to determine where to cut the top. Using a pair of scissors cut the boot so that the top fits snugly around the pipe.

Figure 7



2. Using Mule-Hide Tape Primer, thoroughly clean the EPDM membrane around the pipe. Work the Tape Primer into the sheet with the Scotch-Brite® pad.

3. When the Tape primer is dry, slide the boot down the pipe. Remove the release liner from the tape and press the flange onto the EPDM. Carefully roll the boot flange with a 2-inch steel roller to ensure positive contact. Fold the top of the boot down the pipe about 1 inch.

4. Apply a bead of Water Cut-Off around the top of the fold and turn the fold back up. Install a stainless steel clamp at the top of the boot and tighten the clamp compressing the boot over the bead of Water Cut-Off. After a minimum of 2 hours or at the end of the day, the outside edge of the flange should be wiped with Tape Primer and a clean cloth to remove any dirt or talc. To complete the detail, apply a continuous bead of Lap Sealant around the edge of the boot flange and the top edge of the boot onto the pipe. It is not necessary to trowel or feather the Lap Sealant.

Shingle Tie-In

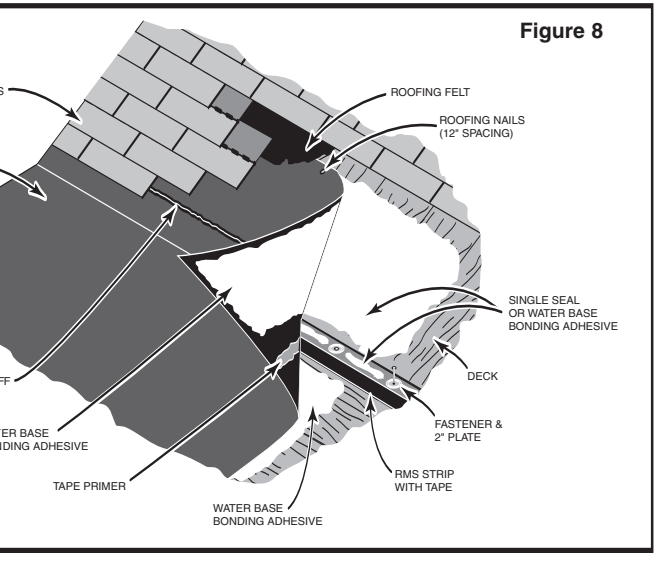
When tying into an existing shingled roof, it is critical to remember that the EPDM membrane should extend up under the shingles a minimum of 3 courses or 18 inches. The following procedures should be strictly followed for proper performance of both roofing systems.

1. Carefully remove the bottom three courses of shingles, including the starter strip and felt. These materials will be replaced during a later step.

2. If not done, install the RMS Strip with Tape at the base of the angle change as shown. (see Figure 8.)

3. Apply an even coat of Mule-Hide Single Seal Adhesive or Mule-Hide Water Base Bonding Adhesive up the roof deck to the top end of the third course of shingles and to the underside of the EPDM membrane. Allow to dry, tacky to the touch. Carefully roll in the EPDM membrane and broom the membrane in with a stiff bristle nylon push broom to ensure the surfaces have mated properly.

Figure 8



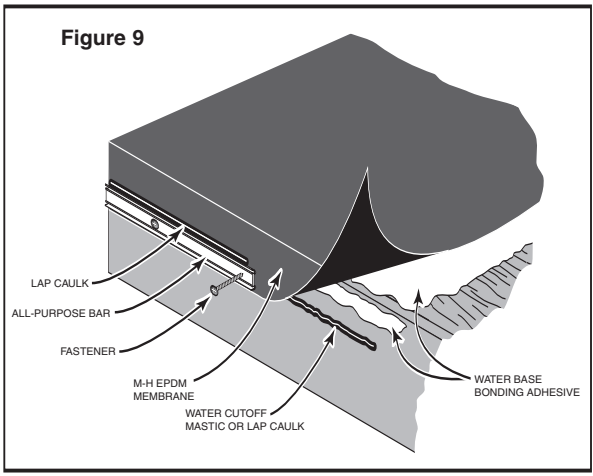
4. Chalk a line on the EPDM membrane for aligning the starter strip. Place a 3/8-inch bead of Water Cut-Off or Urethane Sealant approximately 2 inches to 3 inches above the chalk line and below the area where the nails will be driven to reinstall the starter strip. This will act as a seal for any water or ice backup. Reinstall the starter strip and shingles, running the nails through the Water Cut-Off.

Drip Edge (with All-Purpose Bar)

Once the EPDM membrane has been adhered to the roof deck using Mule-Hide's Water Base Bonding Adhesive, it must be secured at the edge of the roof. The most common method of securing is to run the EPDM over the edge of the roof and terminate it on the vertical side of the fascia board using Mule-Hides' All Purpose Bar, Fasteners, Lap Sealant, and Water Cut-Off.

1. Drape the EPDM membrane over the edge of the roof, making sure you have a sufficient amount of membrane left to cover or attach the All Purpose Bar. (See Figure 9)

2. Fold the membrane back over the roof deck and put a 3/8-inch bead of Water Cut-off or Lap Sealant to the fascia board on a line along the area where the All Purpose Bar will finally be installed.



3. Roll the membrane back over the roof edge and install the All Purpose Bar using Mule-Hide Fasteners every 6 inches. Make sure that the two round or radius points on the All Purpose Bar are facing the fascia board. This will allow a lip for the lap caulk to be applied in step #4.

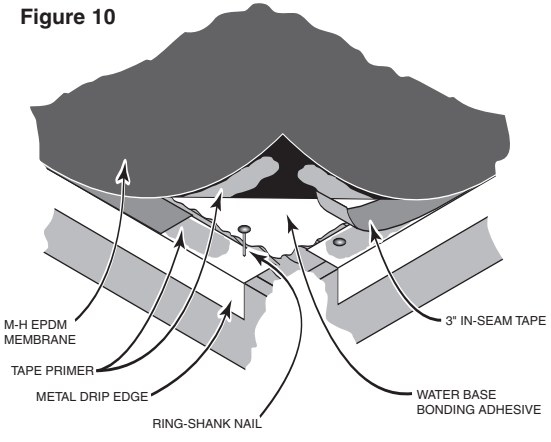
4. Cut off any excess EPDM membrane showing under the All Purpose Bar and apply a bead of Lap Caulk along the lip or top edge of the All Purpose Bar.

Drip Edge (with 3-inch In-Seam Tape)

Sometimes the building owner may have a colored or decorative metal edging which they do not want to have covered with the EPDM membrane and All Purpose Bar. In this situation you may want to use an alternative method of securing the membrane directly to the metal drip edge.

1. Fully adhere the membrane to within 3-1/2 inches from the outside edge of the metal. (See Figure 10) Carefully trim the membrane to approximately 1/2 inch from the edge of the metal. This will allow approximately 1/4 inch of In-Seam Tape to be exposed eliminating the need for Lap Sealant.

Figure 10



2. Fold the EPDM membrane over to expose the underside of the sheet. Using a Scotch-Brite® pad and Mule-Hide Tape Primer, scrub the EPDM membrane and the metal. Allow the Tape Primer to dry.

3. Apply the 3-inch In-Seam Tape tight to the edge of the metal leaving the release liner intact.

4. Roll the membrane back over the 3-inch In-Seam Tape. Starting at one end, remove the release liner. Using light hand pressure,

General Precautions

1. The **first rule** of thumb is **"Do no petroleum-based products such a cement or asphalt-based roof co with the EPDM membrane or its a sories."** Asphalt-based products a compatible with EPDM products.

2. Make sure all surfaces where produc be applied, such as tapes, adhesives, primer, or cleaners, are dry and free and debris. If any areas are cleane soap of any type, rinse thoroughly. soap film will act as a release agent **second rule** of thumb is **"Do not inst new EPDM Roofing System ove materials."** All materials must be tho ly dry prior to installing the EPDM brane.

3. Never work alone.

4. The EPDM membrane can become sl when wet or if frost occurs on the ro face.

5. Be careful when working in weather 50 degrees F since adhesives, primer cleaners will not dry as quickly as in a temperatures with the sun shining. using solvent-based products, if cond tion begins to form on the surface, wor be halted until the weather warms suf ly to evaporate the moisture. Adhesiv require a second coat if this occurs.

brush from the inside outward over the edge to remove any air pockets or wrinkles. Using a 2-inch wide steel roller, thoroughly roll perpendicular to the width of the seam the entire length of the seam using overlapping strokes and then run the roller perpendicular to the length of the seam.

Vertical Wall Termination

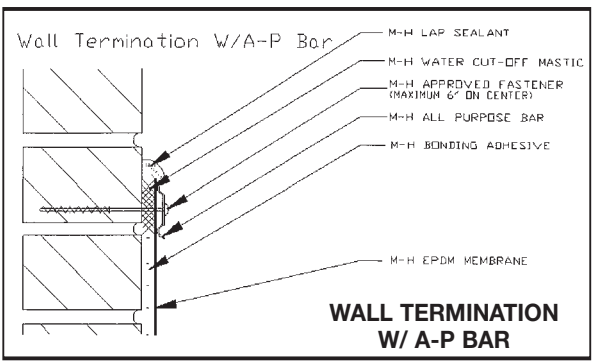
For areas where the EPDM membrane will be terminated to the wall, Mule-Hide recommends the membrane be applied to the vertical surface a minimum of 8 inches high (where possible). A surface termination consists of the Mule-Hide All Purpose Bar, Water Cut-Off, Fasteners and either Lap Sealant or a good quality Urethane caulk.

1. The membrane is adhered to the wall with Mule-Hide's Single Seal or Water Base Bonding Adhesive (Remember, the adhesive must be applied as a contact adhesive as mentioned in the section for Vertical Parapet/ Wall Flashings).

2. Once the point where the membrane will be terminated is decided, chalk a line along the wall. Adhere the membrane to the wall leaving the top 1 inch of wall surface below the chalk line free of adhesive. Thoroughly broom or roll the membrane in place to ensure proper adhesion.

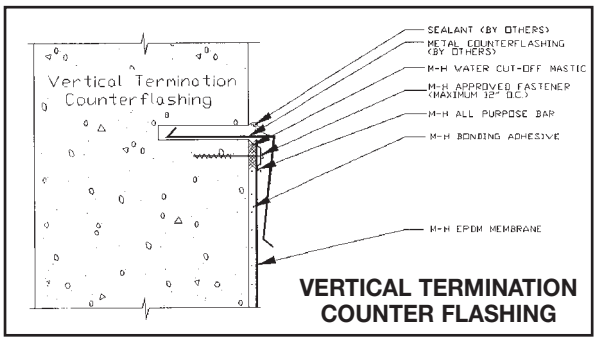
3. About 1/2 inch down from the chalk line apply a heavy bead (3/8 inch diameter) of Water Cut-Off parallel with the chalk line. Lightly press the membrane into the water Cut-Off to hold the membrane in place.

4. Position the All-Purpose Bar over the membrane with the two rounded edges of the bar facing the membrane. This will sandwich the membrane and caulk between the two edges.

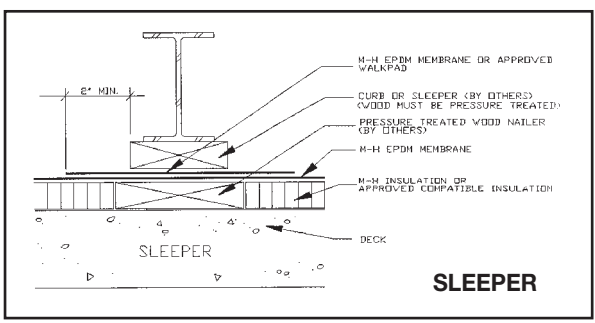


5. Fasten the All Purpose Bar to the wall with the Mule-Hide Fasteners spaced 6 inches on center. Trim off any excess membrane above the bar and apply a bead of Lap Sealant or Urethane Caulk along the top edge of the bar completing the detail. This detail should only be used on shiplapped wood siding, brick, or masonry surfaces. The EPDM sheet should be installed behind any vinyl siding or vertical wood siding. All old roofing materials must be removed before adhering the membrane to the wall.

Other Details



VERTICAL TERMINATION COUNTER FLASHING



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The information herein should not be considered all-inclusive and should always be accompanied by a review of the Mule-Hide specifications and guidelines and good application practices.

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