SECTION 4

MULE-HIDE PRODUCTS CO., INC.

EPDM Fully Adhered Specification

EPDM Fully Adhered Summary Specification

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MULE-HIDE PRODUCTS CO., INC.
FULLY ADHERED EPDM SYSTEM
SPECIFICATION

07 53 00/MUL

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MULE-HIDE PRODUCTS CO., INC.

FULLY ADHERED EPDM SYSTEM SPECIFICATION

07530/MUL

PART 1 – GENERAL

1.01 Description

A. Scope:

1. Furnish and install a Fully Adhered EPDM Roofing Membrane with flashings and accessories necessary to comprise a roofing system. The Mule-Hide EPDM products and accessories shall be installed in strict compliance with current specifications and drawings as published by Mule-Hide products Co., Inc. ("Mule-Hide").

2. The Mule-Hide Fully Adhered EPDM (Ethylene Propylene Diene Monomer) Membrane Roofing System utilizes an .060 inch thick non-reinforced (Black or White-on-Black) EPDM sheet. Optional sheets that may be approved for use in the fully adhered system are .045 inch thick black non-reinforced and .045 inch thick or .060 inch thick polyester reinforced sheets. The EPDM membrane is fully adhered to an acceptable substrate. Adjoining sheets are overlapped a minimum of 3 inches and spliced with Mule-Hide Butyl Splice Adhesive or with Mule-Hide In-Seam Tapes.

B. Related Work:

The work includes, but is not necessarily limited to the installation of:

1. Vapor Retarder (where specified)
2. Wood Blocking (Nailers)
3. Insulation
4. Slip Sheet (where required)
5. Fasteners
6. Roof Membrane
7. Roof Membrane Flashings
8. Metal Flashings
9. Adhesives
10. Sealants
11. Walkways

1.02 Quality Assurance

A. The Mule-Hide Fully Adhered EPDM Membrane Roofing System shall be installed exclusively by an independent roofing contractor eligible to apply for Mule-Hide warranties when Standard System or Premium System Warranties are requested.

B. There shall be no deviations from this specification or Mule-Hide's standard details without prior written approval from Mule-Hide's Technical Department.

C. Upon completion of the installation according to the terms and conditions stated in this specification and in accordance to the information given in the Warranty Application and Pre-Job survey form and any additional approvals which might have been given by Mule-Hide, an authorized representative of Mule-Hide may perform an on-site inspection of the roof to verify that all installation and material requirements have been met.

D. Mule-Hide reserves the right to reject any roof system and refuse to issue any warranty on roofs which do not comply with Mule-Hide's specifications or current policies.

1.03 Submittals

A. Prior to the time of bidding, the roofing contractor shall submit to the Owner or Owner's representative the following items:

1. Copies of Mule-Hide specifications and published product data.
2. Samples of each material to be used in the roof system.
3. Specimen copy of Mule-Hide Products Co. warranty
4. Dimensioned shop drawings to include an outline of the roof and appropriate details for flashings and terminations.
5. Certification from insulation, roofing and accessory components manufacturers that all materials supplied comply with identified ASTM and industry standards.
6. Verification that system specifications meet all identified code and insurance requirements including but not limited to the following:

   a. Factory Mutual Research Laboratories
      Norwood, MA

   b. Underwriters Laboratories
      Northbrook, IL

B. Prior to starting the project, the roofing contractor shall submit to Mule-Hide's Technical Department the following items:

1. All project specifications and details where deviations to the Mule-Hide standard specification are requested.
2. All project specifications where a Premium warranty is required or an extension to the wind coverage is requested.
3. All information necessary to determine compliance with specified UL or FM requirements.

1.04 Product Delivery, Storage and Handling

A. All products delivered to the job site shall be in their original unopened containers or wrappings and clearly labeled with the manufacturer's name, product identification and date of manufacture.

B. Protect all materials from damage during transit, storage and delivery to the job site. Place all materials on pallets and protect from moisture. Materials damaged in handling or storage shall not be used.

C. Store all materials in a dry, clean area protected from the elements. All adhesive and caulking shall be stored at temperatures between 60°F and 80°F. Materials exposed to lower temperatures affect the workability and performance of the product. Products shall be restored to room temperature prior to use.

D. All flammable materials shall be stored in a cool, dry area away from open flames and sparks. Follow precautions outlined on containers or supplied by the material manufacturer/supplier.

E. All materials determined to have been damaged (confirmed by Mule-Hide) are to be replaced.

1.05 Job Conditions

A. This specification shall not be considered applicable without the appropriate additional specifications approved by Mule-Hide if it should be determined that any of the following conditions exist:

1. If the Mule-Hide Roof System should exceed the structural load conditions as determined by an architect or Engineer.

2. When chemical or hazardous materials are discharged onto the Mule-Hide Roof System.

B. The General Contractor or the building owner shall be responsible for providing adequate surfaces and structures to receive the insulation, Mule-Hide Roof System and related sheet metal necessary for the successful completion of the project.

C. Only as much new roofing as can be made watertight each day shall be installed each day. This includes all flashing work.

D. All substrates to receive new insulation, membrane or flashing shall be thoroughly dry. Should surface moisture occur, the contractor shall provide adequate equipment to dry the substrate prior to application of new materials.

E. Prior to and during application, all dirt, debris and dust shall be removed from surfaces to be roofed for both new and reroofing substrates.

F. On all reroof jobs and for all lightweight deck systems, pullout tests shall be performed by the independent roofing contractor, fastener manufacturer or owner's representative to verify the condition of the deck or substrate and to confirm system design pullout values. A minimum of 3 pullout tests for areas up to 50 squares, thereafter 1 test per 100 squares is considered sufficient. Tests should be taken approximately 60% in perimeters and 40% from field areas. Additional tests shall be performed in areas where the integrity of the deck is questionable. A written report of pullout test results shall be submitted to Mule-Hide's Technical Department for review.

G. Precautions shall be taken to prevent wind blow-off or wind damage during the course of the roofing application. This may necessitate additional securement of temporary construction, materials and equipment.

H. The contractor shall verify and ensure that all roof drain lines are unblocked before starting work. Any blockages found shall be reported to the owner's representative and Mule-Hide's Technical Department in writing.

I. Temporary waterstops shall be installed at the end of each day's work. Temporary waterstops shall be removed at the start of the next day's work and disposed of properly. Waterstops shall be compatible with all materials.

J. Do not install the Mule-Hide EPDM Roofing Membrane in direct contact with any product containing coal tar pitch, creosote or penta-based materials. Consult the Mule-Hide Technical Department for special installation requirements.

K. Do not allow contaminants such as petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, animal fat, etc. or direct steam venting to come into direct contact with the Mule-Hide EPDM Roofing Membrane. Contact the Mule-Hide Technical Department for recommendations if such conditions exist.

L. All work shall be scheduled and executed without exposing interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.

M. Arrange work sequence to avoid use of newly constructed roofing for storage, walking surfaces and equipment movement. Contractor shall provide all necessary protection and barriers to segregate the work areas and prevent damage to adjacent areas. If excessive traffic over newly installed membrane is necessary, contractor shall provide plywood or polyester felt protection to prevent damage.

N. All existing roofing materials to be removed for construction shall be immediately removed from the construction site to a dumping area authorized to receive such debris. Follow all laws, regulations and procedures to identify and properly dispose of asbestos materials which are to be torn off.

O. Any unusual or concealed conditions discovered during the course of the work is to be reported to the owner and Mule-Hide immediately in writing. Work is to be halted until the owner has responded with a solution.

P. All local building codes and requirements should be followed where applicable. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements.

Q. Both interior and exterior building areas affected by construction shall be cleaned up and any damaged areas shall be repaired to the owner's satisfaction.

R. Certain project conditions may require modifications to this specification. Contact the Mule-Hide Technical Department if any of the following conditions exist:

1. Roof heights greater than 100 feet.

2. Geographical location in wind zone 3, per Factory Mutual's current edition of Loss Prevention Data Sheet 1-28.

3. Geographical location in a 100 mph or greater wind zone, per the ANSI 100 year mean recurrence interval wind isotach.

4. Location with a D exposure as determined in ANSI A58.1

S. Consideration should be given in the project design to problems that can precipitate from the smooth surface characteristic of the Mule-Hide EPDM membrane. If access is required onto sloped areas when the membrane is wet, walk surfaces may be needed. For northern climates, snow sliding could create a hazard adjacent to the perimeter if a retarding system is not installed above 3 in. per foot slopes.

1.06 Warranties

All Mule-Hide warranties are available for commercial projects. A Roofing Membrane Limited Warranty for a maximum of 10 years is available for residential projects

A. Mule-Hide's Roofing Membrane Limited Warranty

Mule-Hide offers a 10, 15 or 20-year Roofing Membrane Limited Warranty ("Warranty") for a charge. The Warranty covers only the Mule-Hide EPDM membrane (or portion thereof) determined by Mule-Hide to be defective and resulting in roof leaks. This Warranty does not cover workmanship or other components not supplied by Mule-Hide. Mule-Hide does not perform inspections of the installation before issuing the Roofing Membrane Limited Warranty. A Mule-Hide Warranty Application and the appropriate fee must be submitted to Mule-Hide to obtain this warranty. Proof of purchase may be required.

Note: Projects requesting a 20-year Roofing Membrane Limited Warranty require the use of the 60-mil thick EPDM membrane and shall incorporate additional design enhancements as outlined in the 20-year Design Enhancements for EPDM Fully Adhered Roofing System Specification. Mule-Hide recommends that Warranty Applications be submitted for review prior to bidding the project.

B. Mule-Hide's Standard System Warranty

Mule-Hide offers a 10, 15 or 20-year Standard System Warranty ("Standard") for commercial projects for a charge. The Standard warranty is a "No Dollar Limit", labor and material warranty that covers the Mule-Hide labeled membrane and other components supplied by Mule-Hide installed by a Mule-Hide Warranty Eligible Applicator. The Standard warranty does not cover insulation or its attachment system. Metal flashing components are not covered under this warranty. A Mule-Hide Warranty Eligible Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Standard warranties require inspections by a Mule-Hide representative.

Note: Projects requesting a 20-year Standard System Warranty require the use of the 60-mil thick EPDM membrane and shall incorporate additional design enhancements as outlined in the 20-year Design Enhancements for EPDM Fully Adhered Roofing System Specification. Mule-Hide recommends that Warranty Applications be submitted for review prior to bidding the project.

C. Mule-Hide Premium System Warranty

Mule-Hide offers a 10, 15 or 20-year Premium System Warranty ("Premium") for commercial projects for a charge. The Premium warranty is a "No Dollar Limit", labor and material warranty that covers the Mule-Hide labeled membrane, insulation, other components supplied by Mule-Hide and approved products (such as metal flashing, insulation adhesive or other pre-approved accessories) installed by a Mule-Hide Warranty Eligible Applicator. A Mule-Hide Warranty Eligible Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Premium warranties require inspections by a Mule-Hide representative.

Note: Projects requesting a 20-year Premium Warranty require the use of the 60-mil thick EPDM membrane and shall incorporate additional design enhancements as outlined in the 20-year Design Enhancements for EPDM Fully Adhered Roofing System Specification. Mule-Hide recommends that Warranty Applications be submitted for review prior to bidding the project.

D. Standard and Premium System warranties are not available for residential projects.

E. EPDM tie-ins to built-up (BUR) or any other type of roof system are not covered by Mule-Hide warranties.

F. Contact Mule-Hide for other extended warranties that may be available.

G. Terms and Conditions of Warranties

Mule-Hide's obligations under the Roofing Membrane Limited Warranty, the Standard System Warranty, and the Premium System Warranty are limited to the specific terms and conditions of the respective Warranties. Sample copies of the Mule-Hide Warranties are available from Mule-Hide upon request.

PART 2 - PRODUCTS

2.01 General

A. The components of the Fully Adhered Mule-Hide EPDM Membrane Roof System are to be products manufactured or supplied by Mule-Hide Products Co. as specified in the contract documents.

B. Mule-Hide EPDM is membrane is manufactured in accordance with the guidelines of the RMA (Rubber Manufacturers Association) and meets all government specifications for EPDM.

2.02 Roofing Membrane

A. Mule-Hide non-reinforced EPDM membrane is available for use with a Fully Adhered System in standard widths of 7, 10 and 20 feet, and lengths of 50 and 100 feet.

B. Mule-Hide non-reinforced EPDM membrane is available in thicknesses of .045 and .060 inches. The nominal material weight of .045 inch thick membrane is .29 pounds per square foot and .060 inch thick membrane is .39 pounds per square foot.

C. Mule-Hide's EPDM Membrane meets or exceeds the ASTM D 4637 Standard Specification.

D. While non-reinforced EPDM membranes are typically specified for fully adhered systems, reinforced membranes may also be specified.

E. Refer to the Product Data Sheets for the Black, White-on-Black non-reinforced and the Black reinforced EPDM membranes for physical properties additional information.

2.03 Accessory Materials

The following Mule-Hide materials must be used to install Mule-Hide Roof Systems. Mule-Hide will not warrant any application where another manufacturer's product is substituted for a Mule-Hide product. **All products listed below are physically and chemically compatible with each other.**

A. Mule-Hide Splice Adhesive - a black or white solvent based, synthetic rubber based (butyl) product designed for splicing EPDM roof membranes and uncured EPDM Flashings.

B. Mule-Hide Bonding Adhesive (solvent based) - an amber colored synthetic rubber based (neoprene) adhesive designed to bond EPDM membranes to approved insulation boards, metal, concrete, wood and other approved decking materials.

C. Mule-Hide Water Base Adhesive - a non-flammable and non-toxic acrylic latex-based adhesive designed to bond EPDM membranes to approved insulation boards, wood, concrete and other approved decking materials. For horizontal surfaces only (not to exceed inclines greater than 2").

D. Mule-Hide In-Seam Tape - a cured butyl rubber tape designed to adhere EPDM membrane seams in conjunction with Mule-Hide's Tape Primer.

E. Mule-Hide Tape Primer - a cleaner specifically formulated to clean and prime EPDM membrane surfaces to be bonded with splice adhesives, In-Seam Tapes or Cured and Uncured EPDM Laminates.

F. Mule-Hide Seam Cleaner - a black or clear solvent based cleaner used to clean and prep the EPDM membrane prior to the application of the Mule-Hide Splice Adhesive.

G. Mule-Hide Uncured EPDM Flashing - an uncured EPDM membrane (.060 inches thick) to be used in conjunction with the Mule-Hide EPDM Roof Systems. Uncured EPDM flashing is easily formed and used to flash pipes, inside and outside corners and various other penetrations that require a moldable product.

H. Mule-Hide Uncured Laminated Flashing Tape - an uncured EPDM membrane laminated to cured butyl tape. Used to flash pipes, inside and outside corners, “T-joints” and various other penetrations that require a moldable product. Flashing tape is used in conjunction with the Mule-Hide Tape Primer. Mule-Hide Uncured Laminated Flashing Tapes shall **not** be used for stripping seams, gravel stops, drip aprons or batten bars.

I. Mule-Hide RMS Strips - 6 inch wide, cured, reinforced EPDM strips used as a base attachment around curbs and walls to mechanically attach the EPDM field sheet.

J. Mule-Hide Cured Laminated Cover Tape - a cured EPDM membrane laminated to cured butyl tape used as a cover tape to flash gravel stop and drip apron, in conjunction with the Mule-Hide Tape Primer.

K. Mule-Hide Lap Sealant - a one part, black or white elastomeric caulk designed for sealing the exposed edge of field fabricated membrane laps.

l. Mule-Hide Water Cut-Off - a butyl based, one-component mastic designed specifically for sealing roofing membranes to wood, metal, concrete, plastic and other substrates.

M. Mule-Hide Pourable Sealer - a two-component, liquid (100% solids) polyurethane elastomer used as a filler for pitch pockets.

N. Mule-Hide Pipe Boots - an economical pre-molded EPDM flashing designed for flashing single pipe penetrations.

O. Mule-Hide All Purpose Bar - a specially extruded aluminum bar, .050" thick x 1" wide x 10' long, that may be used as an anchor bar, batten bar or as a termination bar.

P. Mule-Hide Fasteners - Factory Mutual approved # 14 heavy duty and # 12 drill point fasteners used for fastening insulation and Mule-Hide All Purpose Bars to roof decks, curbs and walls.

Q. Mule-Hide 2" Barbed Seam Plates - Factory Mutual approved 2" round Galvalume plates with reinforcing ribs used in conjunction with the Mule-Hide HD Fasteners to attach the reinforced membrane and RMS strips.

R. Mule-Hide Plates - Factory Mutual approved 3" round (26 gauge) Galvalume plates with reinforcing ribs used in conjunction with Mule-Hide Fasteners to attach insulation to roof decks.

S. Mule-Hide Insulation - The Mule-Hide Poly ISO 2 polyisocyanurate insulation (flat or tapered) is a closed-cell polyisocyanurate foam core laminated to heavy, black (non-asphaltic) glass fiber reinforced felt facers.

2.04 Related Materials By Others

A. Wood Nailers

1. Mule-Hide recommends wood nailers to be # 2 or better lumber and pressure treated for rot resistance (wolmanized or osmose treated). Creosote and asphaltic preservatives and preservatives containing pentachlorophenol, copper naphthenate or copper 8-quinolinolate are not acceptable.

2. Wood nailers shall be installed in compliance with the recommended options as listed in the Factory Mutual Loss Prevention Data Bulletin 1-49. Methods of attachment (size of fasteners and spacing) are determined by deck type and wind zone requirements. Pull tests may be required prior to the installation of wood nailers to determine the appropriate type of fastener. Refer to the Fastener Guidelines section of this manual for recommended attachment options.

3. Wood Nailers shall be installed as specified on the project drawings and shall be of a height sufficient to match the thickness of the insulation being used. Wood nailers are required for the attachment of drip aprons, gravel stops and certain expansion joints. Wood nailers may be required for metal scuppers, pitch pockets and certain types of curbs.

4. All wood nailers shall be attached to withstand a minimum force of 200 lbs in any direction. All nailers shall have a minimum of 2 fasteners per board.

B. Vapor Retarders

1. Vapor retarders shall meet specified codes and insurance requirements.

2. Vapor retarders shall be compatible with insulation and other accessories.

3. The use and placement of a vapor retarder should be determined by an architect or engineer. Mule-Hide does not require the use of vapor retarders. However, Mule-Hide recommends that a vapor retarder be considered when both of two conditions are anticipated:

   a. The outside average January temperature is below 40°F, and

   b. The expected interior winter relative humidity is 45% or greater.

4. Mule-Hide must be contacted for buildings that are refrigerated (freezers or cold storage) or have a high interior humidity such as, but not limited to, swimming pools, produce storage or locker rooms.

C. Insulation

1. Insulation shall be installed as a protection layer over the existing substrate or to obtain a desired thermal value.

2. Insulation shall be compatible with the Mule-Hide EPDM Membranes, Mule-Hide Adhesives, Mule-Hide EPDM Flashings and other Mule-Hide Accessories.

3. The following generic insulations are acceptable for use in a Mule-Hide Fully Adhered EPDM Roofing System when a standard warranty is requested:

   a. Polyisocyanurate insulations having nonasphaltic facers meeting or exceeding the physical property requirements of Fed. Spec. HH-I-1972 and having a minimum compressive resistance of 18 psi. Thickness minimum is 1 inch or greater as required by the insulation manufacturer to span the flutes of a metal deck.

   b. High density wood fiberboard must be used as an overlay when expanded or extruded polystyrene is specified. High density wood fiberboard may be used as an overlay over an existing roof system (recover application). The minimum thickness is ½ inch.

   c. Expanded Polystyrene insulation must be a minimum of 1" thick and certified by the manufacturer to have a minimum density of 1.00 lb. Refer to the insulation manufacturer's minimum requirements for installation over a fluted steel deck. Review the Insulation Guidelines section of this manual for specific applications and restrictions. **Requires minimum ½ inch high density wood fiberboard as an overlay.**

   d. Extruded Polystyrene must be a minimum of 3/4" thick (½" min. over smooth surfaced BUR). Refer to the Insulation Guidelines section of this manual for specific applications and restrictions. **Requires minimum ½ inch high density wood fiberboard as an overlay.**

   e. State and local building codes should be reviewed regarding the installation of expanded or extruded polystyrene insulation directly over a steel deck.

4. Mule-Hide Premium Warranties require the use of the Mule-Hide Poly ISO 2 insulation. Use of other insulations shall disqualify the project for consideration of the issuance of a Premium warranty. Contact the Mule-Hide Technical Department for specific requirements. Premium warranties are not available for recover applications without an independent moisture survey.

D. Sheet Metal

1. Sheet metal components such as gravel stops, drip aprons, counterflashings, copings, etc., should be fabricated and installed in accordance with the SMACNA recommendations and requirements.

2. Sheet metal components supplied by others are not covered by the Mule-Hide warranties. Contact Mule-Hide's Technical Department for specific requirements.

2.05 Precautions

A. Consult Material Safety Data Sheets and container labels for specific safety instructions prior to use.

B. Avoid breathing vapors of solvents, cleaners, primers, sealants and adhesives. Use with adequate ventilation. Avoid prolonged contact of solvents, sealants, cleaners, primers and adhesives with skin. Solvent resistant rubber gloves should always be worn during use.

C. Do not use Mule-Hide EPDM roofing products near fire or flame. Do not use open flames for drying of surfaces, sealants or adhesives. **Do not smoke near flammable products.**

D. Do not use oil-based paint on EPDM membranes. Contact Mule-Hide's Technical Department for recommendations for compatible color coatings.

E. Do not allow muriatic acid (masonry cleaner) to come in direct contact with the Mule-Hide EPDM membranes, flashings or accessories.

F. Do not allow Mule-Hide EPDM membranes or accessories to come into direct contact with steam or vents that produce temperatures in excess of 180°F (82°C).

G. The Mule-Hide EPDM Roof System may be installed in cold weather provided the adhesives are stored at room temperature until just prior to use and used within 2 hours. Adhesives left in the cold must be returned to room temperature prior to use.

H. Cover Tapes, Flashing Tapes and In-Seam Tapes may loose tack when exposed to temperatures below 40°F. for extended periods of time. A heat gun may be used to warm the product. Only apply heat to the EPDM side or in the case of In-Seam Tapes, apply heat to the kraft paper side. Be careful not to over heat. Hot boxes are the preferred method to warm tapes.

I. In cold temperatures when the ambient temperature is near the dew point, condensation may form on the seam cleaner, tape primer and adhesive as the solvents flash off. If condensation occurs, discontinue the application and allow the surface to dry. **Do not attempt to dry the surface with heat guns or torches.** When weather permits apply a new coat of product.

PART 3 - EXECUTION

3.01 General

When installing a Mule-Hide Fully Adhered EPDM roof system in cooler weather, it is recommended that liquids such as solvents, sealants, etc., be stored at temperatures of 60° F. or more until just prior to use in order to facilitate the installation.

3.02 Substrate Conditions

The following general conditions apply to the substrate that will receive a Mule-Hide Fully Adhered EPDM Membrane Roofing System for recover, reroof and new construction:

A. The roof deck must be structurally sound and free of defects to provide proper securement for mechanical fasteners. Areas showing a loss of integrity due to corrosion, rotting, warping, concrete spalling, etc., must be repaired or replaced prior to installing the roofing system. The roofing contractor shall make an inspection of the deck prior to starting the roof installation, and if there is no general contractor, the roofing contractor shall be responsible for correcting any defects.

B. It is imperative that the roofing contractor performs test cuts at each roof area prior to recover applications. The condition of the substrate must be suitable to receive a Mule-Hide Fully Adhered EPDM Membrane Roofing System. Wet insulation must be removed and replaced.

C. A determination must be made regarding the presence or absence of coal tar pitch within the existing roof assembly. The presence of coal tar pitch may restrict the use of certain insulations. Extruded and expanded polystyrene insulations must not be installed directly over a coal tar pitch roof. An underlayment must be installed prior to the installation of the polystyrene insulation. Contact the Mule-Hide Technical Department for recommendations.

D. Contact the material manufacturer when the substrate is exposed to excessively high humidity, low temperature or a corrosive environment. Special fasteners (i.e. stainless steel), vapor retarders or details may be required.

E. Fastener pullout tests are strongly recommended to determine the suitability of a roof deck.

F. It is acceptable to install a Fully Adhered Mule-Hide EPDM Membrane Roofing System over the following deck substrates provided that an acceptable insulation is installed over the substrate as required:

1. Structural Metal Deck (22 gauge minimum) shall conform to recommendations outlined in Factory Mutual's Loss Prevention Data Sheet 1-28. Steel decks require the installation of the Mule-Hide Poly-ISO-2 insulation or other approved insulation. The minimum acceptable pullout value is 360 lbs.

2. Structural Concrete, pre-cast and pre-stressed concrete (3,000 p.s.i. minimum) shall be cured and dry to industry standards and surface shall be smooth, clean and free of moisture or frost. The minimum acceptable pullout value is 360 lbs.

3. Wood plank (1" minimum) shall conform to Factory Mutual's requirements for Class I impregnated decks. The minimum acceptable pullout value is 360 lbs.

4. Plywood (15/32" minimum) - See the Mule-Hide specification manual for specific attachment patterns. The minimum acceptable pullout value is 360 lbs.

5. Cementitious Fiber Substrates (Tectum, etc), Lightweight Concrete and Gypsum Decks may be acceptable after pullout tests have been completed and appropriate fasteners and attachment patterns/densities have been determined. The minimum acceptable pullout value is 300 lbs.

3.03 Preparation Of Existing Substrate

A. Substrates for roofing materials shall be dry and free of oil, dirt, grease, sharp edges and debris. Inspect substrates and correct defects before application of roofing membrane. Specifier or roofing contractor shall determine the condition of the existing roof deck and roofing system. Areas with deteriorated decking or wet insulation or other failed materials shall have those affected materials removed and replaced. Make sure all decking is securely fastened. The roofing contractor has the final responsibility to ensure an acceptable deck is provided to receive the new roof system.

B. Significant ponding that remains after a period of 48 hours should be eliminated by either installing tapered insulation to create positive drainage of the roof surface or by installing new drains in the low areas where the ponding remains. Positive drainage shall also eliminate the possibility of excessive live loads caused by ponding water that could cause structural damage or failure.

C. Ponded water, snow or ice shall be removed before installing the Mule-Hide Fully Adhered System. Do not roof over moisture in any form.

D. Recover Projects

1. When installing a new roof system over an existing gravel surfaced built-up roof, all loose gravel must be removed to prevent moisture entrapment. Insulation must always be used as a protection course for the EPDM membrane.

2. When installing a new roof system over an existing single-ply roof system, the existing roof membrane must be cut up into maximum 10' x 10' sections to prevent entrapment of water between the two roof systems.

3. Sprayed in place urethane foam roof systems are not acceptable substrates for Mule-Hide Single-Ply roof systems and must be removed.

4. Existing smooth surfaced built-up roof systems and mineral surfaced modified or built-up roof systems must have an acceptable insulation prior to installing the Mule-Hide Fully Adhered Roofing System.

5. If a Mule-Hide Premium warranty is requested, the existing roof system **must be removed to the deck** prior to the installation of the new roofing system or a moisture survey must be taken, all wet areas removed and a copy of the survey submitted to Mule-Hide with the warranty application.

3.04 Vapor Retarder

A. Specific climate and job conditions may require the use of a vapor retarder. It is the sole responsibility of the design professional to determine the need for a vapor retarder, its type and location in the roofing system.

B. The roofing contractor must follow the recommended installation procedures of the respective vapor retarder manufacturer and the project specifier’s instructions for the type of vapor retarder specified for the project.

3.05 Wood Nailers

A. Nailers shall be firmly anchored to the decks at a maximum 2'-0" o.c. and shall resist a pullout force of 200 lbs./linear foot in any direction. Spacing and fastener embedment shall conform to Factory Mutual Loss Prevention Data Sheet 1-49.

B. Refer to the Fastener Guidelines section in this manual for the type of fastener to be used with each type of deck and the maximum spacing requirements.

C. Wood nailers shall be installed as specified by the project specifier and shall be in compliance with the Mule-Hide Standard Details.

D. The thickness of the wood nailer shall be determined so that the top of the nailer is flush with the top of the surface of the insulation.

E. Wood nailers installed along the perimeter of a roof surface, where a drip apron or gravel stop shall be installed, shall have a width that is wider than the metal flange to be installed.

F. Where pitch pans or scuppers are to be installed over wood nailers, the wood nailers must be wider than the metal flanges.

3.06 Insulation Installation

A. Insulation shall be secured to the roof deck in accordance with Mule-Hide's requirements utilizing Mule-Hide fasteners and plates. When installing insulation, the end joints of each row of insulation shall be offset against the previous row. When more than one layer of insulation is to be used, succeeding layers are to be laid staggered in relation to the previous layer of insulation and all joints shall be offset.

B. Insulation installed over steel decks shall be checked so that no edges are left unsupported along the flutes. All insulations shall be of sufficient thickness and density to prevent breakage under normal roof construction traffic.

C. Insulation other than Mule-Hide’s Poly ISO 2 must be an FM approved insulation and acceptable to Mule-Hide for use under the Mule-Hide Fully Adhered Roofing System.

D. Determine the insulation fastening patterns which will be used for the perimeter, corners and field of the roof. This information may be found in the Insulation Guidelines section of this manual. Unless otherwise approved by Mule-Hide prior to the start of the project, the standard mechanical attachment of an acceptable insulation shall be 1 fastener and insulation plate per every 2 square feet. Acceptable deviations to this requirement shall be found in the Insulation Guidelines section of this manual.

E. Refer to the insulation manufacturers guidelines for the appropriate type, size and thickness of the insulation needed for use over the respective substrate and under the Mule-Hide Fully Adhered Roofing System.

F. Insulation shall be cut to fit snugly around or against all protrusions, nailers, drains, pipes and walls. All gaps greater than 1/4" wide shall be filled with the same material.

G. Do not install any more insulation than can be covered by the membrane by the end of the working day and made watertight.

H. As an alternate method of attachment to a structural concrete deck, hot mopping of the insulation (maximum 4'x 4' sheets) or the use of Insta-Stick is acceptable. The asphalt (Type III or Type IV) must be applied over primed concrete at a minimum rate of 25 lbs. per square. The insulation must be set in a full mopping (100%). Strip or spot mopping is not acceptable. Insta-Stick must be installed in compliance with the recommendations of the manufacturer, Insta-Foam, Inc.

I. Crickets and saddles may be installed beneath the specified insulation where possible. Crickets and saddles made from non-compatible insulations or materials must be overlaid with an acceptable insulation or underlayment to which the membrane may be adhered. For crickets and saddles with slopes greater than 2" per foot, the membrane must be mechanically attached at each angle change.

J. When Factory Mutual uplift requirements (FM 1-60 or 1-90) are required, contact the Mule-Hide Technical Department for appropriate attachment patterns and quantities per board size.

K. Only FM approved fasteners and plates may be used to attach the insulation. When a Mule-Hide Premium Warranty is requested, only Mule-Hide labeled fasteners and plates may be used to attach the insulation and the only acceptable insulation shall be the Mule-Hide Poly-ISO-

3.07 Membrane Installation

A. Mule-Hide strongly recommends the .060 inch thick EPDM membrane 10' wide and 100' long be used with the Mule-Hide Fully Adhered Roofing System. Sheets wider than 10' will have factory folds that may not relax and lay flat during cold weather that may cause problems while seaming the sheets together. The .045 inch thick EPDM may exhibit wrinkles due to swelling caused by the solvent in the adhesive.

B. Unroll the Mule-Hide EPDM Membrane and position without stretching. Large sheets may be moved into final position by encapsulating air under the membrane and floating it into place. Allow the membrane to relax at least 30 minutes prior to installation. Inspect and remove any damaged membrane. Lap sheets a minimum of 4" to allow for a proper field splice. Membrane overlaps shall be shingled with the flow of water. Membrane should run perpendicular to the direction of steel deck flutes and orientation of wood decks where possible.

C. After carefully positioning several sheets of the EPDM membrane, one half of the first sheet's length shall be pulled back to expose the bottom side of the sheet. Mule-Hide suggests the fold in the sheet should run parallel with the length of the sheet. Smooth out the sheet to remove any wrinkles.

D. A smooth, even coating of Mule-Hide (solvent-based) Bonding Adhesive shall be applied to the substrate that will be covered by the first sheet and allowed to dry 5-20 minutes depending on the substrate and environmental conditions. Apply an even coat of Mule-Hide Bonding Adhesive to the backside of the first sheet. The adhesive shall be applied at a net (both surfaces) rate of 1 gallon per 60 sq. ft. of finished surface with a minimum ½" nap solvent-resistant paint rollers. It is recommended that the adhesive be applied to the substrate and the sheet at the same time to allow both surfaces to dry uniformly. The most common tool used for the application of the adhesive is the 9" paint roller as it will easily fit into the 5 gallon pails. If the adhesive is sprayed, the adhesive must be rolled with a paint roller immediately after spraying.

E. When the adhesive on the membrane has dried sufficiently to be tacky but not produce adhesive legs or strings with a light touch of a dry finger, the coated membrane shall be slowly rolled onto the coated substrate in such a manner as to eliminate wrinkles and trapped air. If the adhesive on either surface has dried excessively, then the surface in question must be recoated with adhesive. The adhesive must show complete transfer between the substrate and membrane surfaces when peeled back as evidenced by adhesive legs and strings.

F. After the adhesive coated substrate and membrane surfaces have been mated, the bonded surface must be broomed with a large nylon bristled push broom to promote 100% adhesion. The remaining half of the first sheet shall be folded back and the adhering procedure repeated. On each succeeding sheet of EPDM Membrane, sheet alignment, adhesive application, adhering and rolling procedures shall be repeated. Do not apply bonding adhesive to the seam area. Each succeeding sheet shall be overlapped a minimum of 4" with each lap shingled with the slope of the roof.

G. Wrinkles that transmit through the seams must be cut out and patched using cured sheet.

H. All seams shall be spliced following the procedures in section 3.09 of this specification.

I. The roof membrane shall extend up the vertical surface a minimum of 1" and shall turn down over the edge of the roof a minimum of 2" or as required by the Mule-Hide details.

3.08 Alternate Bonding Procedures

In addition to the Mule-Hide (solvent-based) Bonding Adhesive, one other adhesive is available from Mule-Hide for the purpose of bonding the EPDM membranes to acceptable substrates.

A. Mule-Hide Water Base Bonding Adhesive

1. The Mule-Hide Water Base Bonding Adhesive (WBA) is an acrylic latex-based adhesive that is white in color and becomes clear when dry. The Water Base Bonding Adhesive is only used for adhering the EPDM membrane to horizontal surfaces. **The Water Base Bonding may not be used on slopes exceeding 2" per foot and is not acceptable for vertical applications.**

2. The Water Base Bonding Adhesive may be used as a single-side adhesive when applying over **porous** surfaces such as high density wood fiberboard, plywood, oriented strand board, wood plank, Dens-Deck or moisture-resistant gypsum board.

3. The single-side application is when the adhesive is only applied to the substrate and the membrane is immediately rolled in place into the white, wet adhesive. Mule-Hide does not recommend applying the adhesive to the membrane in a single-side application as the quantity may not be sufficient to properly bond to the substrate.

4. The recommended minimum application rate is 7 to 10 wet mils in thickness.

5. Unroll the Mule-Hide EPDM Membrane and position without stretching. Large sheets may be moved into final position by encapsulating air under the membrane and floating it into place. Allow the membrane to relax at least 30 minutes prior to installation. Inspect and remove any damaged membrane. Lap sheets a minimum of 4" to allow for a proper field splice. Membrane overlaps shall be shingled with the flow of water. Membrane should run perpendicular to the direction of steel deck flutes and orientation of wood decks where possible.

6. After carefully positioning several sheets of the EPDM membrane, one half of the first sheet's length shall be pulled back to expose the bottom side of the sheet. Smooth out the sheet to remove any wrinkles.

7. A smooth, even coating of Mule-Hide Water Base Bonding Adhesive shall be applied to the substrate that will be covered by the first sheet. As the adhesive is being applied to the substrate, the membrane should immediately be rolled into the adhesive while the adhesive is still wet. The coverage rate is approximately 125 to 160 square feet per gallon. The coverage rate will vary with the degree of porosity of the surface being covered.

8. It is recommended that the adhesive be applied to the substrate using a 9" paint roller with a minimum ½" nap solvent-resistant paint roller as it will easily fit into the 5 gallon pails. If the adhesive is sprayed, the adhesive must be rolled with a paint roller immediately after spraying. If the adhesive begins to turn clear, it is too dry and shall require a second coat.

9. Once the sheet has been rolled out, it must be broomed with a large nylon bristled push broom to promote 100% adhesion. Fold back the unadhered half of the sheet and repeat the procedure.

10. 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 has been rolled into the adhesive at the right time.

Failure to observe sufficient adhesive on the membrane indicates either a less than sufficient amount of adhesive applied or waiting too long to roll in the membrane. The contractor shall adjust the application accordingly. The porosity of the substrate or climatic conditions may require a heavier coat of adhesive.

11. Install subsequent sheets in the same manner, overlapping the previous sheet a minimum of 3" for the splice area. All sheets must be lapped in shingle fashion.

12. The Mule-Hide Water Base Adhesive may be used as a contact adhesive to adhere the EPDM field sheet to certain approved non-porous surfaces such as polyisocyanurate insulation. Refer to the Flashing Guidelines section of this manual for application instructions and coverage rates.

3.09 Splicing Of Lap Areas

A. Splicing seams with Mule-Hide Splice Adhesive

1. Make sure that the top sheet is lapped over the bottom sheet in shingle fashion so that the water will flow over the seam edge and not against it.

2. All surfaces to be spliced shall be clean and dry. Overlap the adjacent membrane a minimum of 3" and fold back the top sheet approximately 12" to allow for cleaning. Remove excess talc by wiping the seam area with clean damp rags. Dispose of all rags as they become dirty.

3. Prepare each surface of the seam by scrubbing the cleaned areas with Mule-Hide Seam Cleaner using clean cotton rags. Additional cleaning may be required along the factory seams that intersect the seam area to remove excess accumulations of talc. Rags must be replaced with clean ones as they become dirty. The cleaned membrane should have a uniform black color when dry. There should be no streaks present.

   a. Mule-Hide Black Seam Cleaner must be used with the black EPDM membranes.

   b. Mule-Hide Clear Seam Cleaner must be used with the White-on-Black EPDM membranes.

   c. Mule-Hide Tape Primer may be used as a substitute for either the Black or Clear Seam Cleaner. Review the section (3.09.B.) on Tape installation for cleaning procedures to be followed when using the Mule-Hide Tape Primer.

4. Seam Cleaners, Tape Primer and Splice Adhesives must be thoroughly stirred prior to application. Be sure to scrape the sides and bottom of the cans while stirring.

5. Apply the Splice Adhesive to the cleaned surfaces of both sheets. Mule-Hide recommends the use of a solvent resistant, 3" - 4" wide, short bristle paint brush or a solvent resistant 3" wide, ½" medium nap, paint roller.

6. Apply the adhesive in a uniformly thick even coat. When using a paintbrush do not use a circular motion. Use long, straight strokes applying sufficient adhesive that will achieve a smooth surface without leaving brush marks. When using a roller do not over roll the adhesive as this will cause an uneven application.

7. Do not allow the adhesive to puddle or leave globs as these areas will not dry properly and may cause excessive swelling of the membrane which will result in fishmouths in the finished seam.

8. Adhesive must be applied to both surfaces of the seam at the same time to allow for uniform drying of the adhesive. The adhesive must fully cover the surface of the splice areas a minimum of 3" wide.

9. Allow the adhesive to dry until tacky to the touch of a dry finger without stringing or sticking to the finger and does not move when pushed forward or the finger is twisted.

Note: Drying time (also referred to as Flash Off time) will vary from day to day depending on the ambient weather conditions. In colder weather, condensation may form on the surface of the adhesive that is caused by the solvent flashing off. If this occurs, the application of the Splice Adhesive should be discontinued. The surface must be allowed to dry and a thin coat of adhesive must be applied over the existing adhesive.

10. Roll the top sheet onto the bottom sheet being careful not to stretch or wrinkle the membrane. Apply hand pressure brushing from the inside of the sheet outward to the edge removing air and fishmouths.

11. Using a 2" wide steel roller, apply positive pressure rolling from the inside of the seam working out over the edge of the sheet perpendicular to the direction of the seam. The entire seam must be rolled in this manner. A J.R. Seamer Power Roller may be used in place of the 2" steel roller.

12. All "T-joint" laps in the field membrane shall be reinforced with a 6" piece of uncured EPDM membrane (uncured flashing tape may also be used) centered over the intersection of the edges of the seams. All “T-joint” patches shall be caulked with Lap Sealant.

13. Field seams and flashings should be allowed to set for several hours prior to the application of Lap Sealant. At the latest, Lap Sealant should be applied to all seam edges at the end of the workday and before any moisture has a chance to form on the membrane.

14. Just prior to applying the Lap Sealant, the seam and flashing edges shall be cleaned with a clean rag or cloth using the Mule-Hide Seam Cleaner to remove any dirt or talc that may remain along the seam edge. Be sure that all edges of the splice have been covered with a continuous bead of Lap Sealant. It is not necessary to trowel (screed) the caulk. The Lap Sealant shall be applied at a maximum rate of 20 linear feet per tube.

B. Splicing seams with Mule-Hide In-Seam Tapes

1. Make sure that the top sheet is lapped over the bottom sheet in shingle fashion so that the water will flow over the seam edge and not against it.

2. All surfaces to be spliced shall be clean and dry. Overlap the adjacent membrane a minimum of 3" and fold back the top sheet approximately 12" to allow for cleaning. Remove excess talc by wiping the seam area with clean damp rags. Dispose of all rags as they become dirty.

3. Prepare each surface of the seam by scrubbing the cleaned areas with Mule-Hide Tape Primer using clean cotton rags or Scotch-Brite® pads. Additional cleaning may be required along the factory seams that intersect the seam area to remove excess accumulations of talc. Rags and Scotch-Brite® pads must be replaced with clean ones as they become dirty. The primed membrane should have a uniform black color when dry. There should be no streaks present. The Mule-Hide Tape Primer shall be thoroughly stirred prior to use.

4. Roll the top sheet back over the bottom sheet and mark the bottom sheet to allow for proper placement of the In-Seam Tape. Mark the bottom sheet along the edge of the top sheet, but ½" away from the sheet, as a guide for the installation of the In-Seam Tape. Do not use a chalk line or any type of marker that will prevent the seam tape from sticking.

5. Fold the top sheet back. Approximately 1/8" to 3/8" of In-Seam Tape should be exposed along the completed seam. Unroll 2 or 3 feet of the In-Seam Tape leaving the release liner in place. Align the In-Seam Tape so that the edge of the release liner is touching the guideline. Do not install the tape over the line. Leaving the release paper in place, install the In-Seam Tape along the marks on the bottom sheet. Roll the tape with a 2" steel roller along the entire length of the seam. The roller must run perpendicular to the tape with overlapping strokes. If more than one piece (roll) of tape is required to complete a seam, the second piece of tape must overlap the first a minimum of 1 inch.

6, Where In-Seam Tapes intersect at the corner of a sheet, the tapes must overlap a minimum of 1 inch.

7. Fold the top sheet back onto the tape so that the sheet is laying over the release paper. Peel the release paper off the tape at a 45° angle and parallel with the roof allowing the top sheet to fall freely onto the exposed tape. Press the seam together using hand pressure and wiping toward the splice edge. Immediately roll the seam with a 2 inch wide steel roller, using positive pressure, toward the edge of the seam.

8. Wait a minimum of 2 hours prior to application of the Lap Sealant. The Lap Sealant is only required at intersections with factory seams, where two pieces of tape overlap within the seam and on patches installed over “T-joints”. A bead of Lap Sealant should be applied along the overlap for 6" in each direction from the center point of the overlap.

C. Regardless of the method used to splice the seams, all seams must be thoroughly inspected for fishmouths, bubbles, blisters and wrinkles and repaired as necessary.

1. If fishmouths or wrinkles occur through the seam, they must be cut out and patched with cured membrane (cured cover tape may be used).

2. Patch with cured EPDM membrane or Cured Cover Tape (do not use uncured flashing or flashing tape) that is at least 3 inches larger in all directions than the area that has been cut out. Round the corners of the patch.

3. Center the patch over the area to be repaired. Follow the splicing procedures for the appropriate material used.

3.10 Membrane Securement (Mechanical)

A. Additional securement of the EPDM membrane by mechanical attachment must be provided at the perimeter of each roof level, base of walls, curbs, skylights, expansion joints, tie-ins, interior walls, bottom of valleys and top of ridges of sloped roofs, angle changes that exceed inclines of 2" or greater per foot and various penetrations as shown in the Mule-Hide Standard Details. All securement must be either horizontally to the roof deck or vertically to the base of the various penetrations as shown in the Mule-Hide Standard details.

B. The mechanical attachment of the membrane may be achieved by the following methods:

1. Mule-Hide All Purpose Bar

a. The Mule-Hide All Purpose Bar is a specially extruded aluminum bar that has pre-punched holes 6 inches on center. The bar may be placed either horizontally or vertically depending on the detail followed. Refer to the Mule-Hide Standard Details for the proper placement of the bar.

b. The maximum spacing of the fasteners shall not exceed 12 inches on center. Adjoining bars should be spaced approximately ½ inch to 1 inch apart. All bars must be attached at the ends a maximum of 1 inch from the end of each bar. This may require pre-drilling additional holes. All cut bars shall be deburred.

c. Under no circumstances shall the All Purpose Bar be stripped with 6 inch uncured flashing or uncured flashing tape. Mule-Hide allows only the use of Cured Cover Tape or cured field sheet to strip over the All Purpose Bar.

d. The All Purpose Bar must be installed a minimum of 3 inches to a maximum of 6 inches from inside and outside corners.

2. Mule-Hide RMS (Reinforced Membrane Strip) attachment strip

a. The RMS is a 6" wide reinforced strip of EPDM membrane that may be installed at the base of walls and curbs. Mule-Hide 2 inch barbed seam plates are used to attach the RMS either horizontally or vertically with appropriate fasteners. Refer to Mule-Hide Details # MHE-124 and MHE-125 for appropriate placement of the RMS, plates and fasteners. The RMS is installed prior to the placement of the field sheet.

b. Follow the standard procedures for cleaning and splicing the RMS and field sheet. Only the Mule-Hide Black Seam Cleaner and Mule-Hide Black Splice Adhesive may be used to seam the RMS to the field sheet. Bonding Adhesive and Single Seal Adhesive are **not permitted** for use with the RMS attachment strips. Lap sealant is not required. The RMS is also available as a pre-taped product. Use Mule-Hide Tape Primer to prepare the membrane surface when using the pre-taped RMS.

c. Spacing of the fasteners shall not exceed 12 inches on center. Adjoining RMS strips shall be spaced a maximum of 1 inch apart. It is not required to overlap the RMS.

d. For vertical attachment, the RMS membrane must extend a minimum of 3 inches onto the horizontal surface (roof substrate). Refer to Mule-Hide Detail # MHE-124. Installation of the plates must be a minimum of 6 inches to a maximum of 9 inches from the inside and outside corners.

e. For horizontal attachment, the membrane must be placed a maximum of ½ inch from the base of the angle change extending out onto the horizontal surface (roof substrate). The 2 inch barbed plates must be placed a minimum of ½ inch to a maximum of 1 inch from the exterior edge of the strip. Refer to Mule-Hide Detail # MHE-125. Installation of the plates must be a minimum of 6 inches to a maximum of 9 inches from the inside and outside corners.

3. Drip Apron and Gravel Stop

   a. For drip aprons and gravel stops, the metal flange shall extend a minimum of 3 inches onto the wood nailer. The wood nailer must be wider than the metal flange. Approved screw fasteners shall be installed a maximum of 6 inches on center and ½" to 3/4" from the inside edge of the metal flange. Ring shank nails spaced a maximum 4" on center may also be used.

   b. All drip aprons and gravel stops shall primed with Mule-Hide's Tape Primer and stripped with Mule-Hide's Cured Cover Tape. Cleaning the metal with a solvent such as toluene or xylene to remove oil film may be required prior to installing and priming with the Mule-Hide Tape Primer.

   c. The edge of the Cured Cover Tape overlapping the metal flange shall be caulked with Lap Sealant. For those areas where water flows over the drip apron, both sides of the Cured Cover Tape must be caulked.

3.11 Flashing Installation

All walls, parapets, curbs and penetrations shall be flashed with cured EPDM membrane where possible. The use of uncured EPDM flashing or Uncured Flashing Tape shall be limited to those areas such as corners, pipes, scuppers, patches over "T-joints", patches at the base of all vertical field seams (at the angle change) and other shaped penetrations that require the flashing to be molded and cured product is not practical. All flashing shall be performed in accordance with Mule-Hide's Standard Details. Additional information may be found in the Flashing Guideline Section of this manual.

Note: Mule-Hide's Water Base Adhesive is not permitted for use on vertical surfaces.

A. Vertical Wall, Curb and Skylight Flashings.

1. Cured EPDM membrane should be used to flash all vertical surfaces except when flashing inside and outside corners or other details that require the flashing to be molded.

2. There are two basic methods of flashing vertical surfaces. Each method is dependent on the mechanical base attachment used.

   a. When using the RMS strip as the mechanical attachment, the field sheet may be continued up the vertical surface to the point of termination.

   b. When using the All Purpose Bar as the mechanical attachment, the field sheet is turned up the vertical surface as depicted in details # MHE-120 or MHE-122. Cured EPDM membrane is used to flash over the bars and is continued up the vertical surface to the point of termination.

3. The minimum height of the flashing on a vertical surface is 8 inches where possible. For recover projects where the existing BUR flashings are left in place, the EPDM membrane flashing must extend above the height of the existing flashings with the termination of the membrane being made directly to the wall or curb surface.

4. All loose or unsecured existing flashings must be removed. Excessive asphalt should also be removed to provide a smooth surface. Aluminum coated flashings must be removed or covered with an appropriate rigid substrate. New substrate must be sufficiently attached to provide a rigid surface.

5. Surfaces such as corrugated metal siding, stucco and various other irregular surfaces are not acceptable substrates for adhering vertical flashings. Refer to the Flashing Guidelines section of this Manual for recommendations.

6. Existing through-wall counterflashings, weep holes and overflow scuppers must not be covered by the new EPDM membrane flashings. Termination of the membrane must be below the through-wall counterflashings.

B. Pipe Flashings.

1. Single pipe penetrations may be flashed with Mule-Hide pre-molded pipe boots where possible. Where a boot cannot be used, Mule-Hide's Uncured Flashing or Uncured Flashing Tape may be used. Pre-molded pipe boots cannot be cut and patched to wrap around a pipe.

2. For recover applications, existing flashings (including lead) must be removed.

3. Hot pipes exceeding 180 degrees shall require the installation of an insulated cold collar (sleeve) to which the flashings may be adhered. Cold collars require the use of rain hoods to prevent leakage.

4. Pitch pans may be required to seal pipe clusters where boots or field fabrication is not possible. Pitch pans may also be required for irregular objects of such a configuration that prevents standard flashing procedures.

C. Drains and Scuppers

1. For recover applications, all existing flashings (including lead) shall be removed. A smooth tapered transition from the new insulation to the drain housing must be provided. The drain must be clean and free of any asphalt where the clamping ring seats. **Lead flashings must be removed**.

2. Field seams must not run through the drains. Target patches (4'x 4') are required when field seams intersect drains.

3. For recover applications, existing scuppers should be removed and replaced with new scuppers.

4. Cured membrane must be flashed to the vertical surface prior to the installation of new scuppers. New scuppers must have welded watertight corners, be set in Mule-Hide's Water Cut-Off and secured to the wall and deck (or wood nailer) with the appropriate fasteners.

D. Expansion Joints And Existing Roof Tie-Ins

1. Tie-ins to existing roof systems are not covered by the Mule-Hide Warranties. Tie-ins will vary with the type of existing roof system. Mule-Hide strongly recommends that the new roof system be isolated to the deck surface. Refer to the Mule-Hide Details # MHE-160, MHE-161 & MHE-162.

2. Whenever there is an expansion joint in the roof deck or walls, an expansion joint must be installed in the roof system when installing a fully adhered system. Refer to the Mule-Hide Standard Details for various flashing procedures.

3.12 Temporary Night Seals

A. Install temporary cutoffs around incomplete edges of roofing assembly at the end of each day's work and when work must be postponed due to inclement weather.

B. All loose membrane edges should be sealed with Mule-Hide’s Water Cut-Off or Pourable Sealer to prevent water migration under the finished roof sections.

C. For temporary tie-ins to existing BUR roof systems, remove all gravel, dirt and debris from the tie-in area and make sure all surfaces are clean and dry. Using either the Water Cut-Off or the Pourable Sealer, apply a heavy continuous bead along the length of the tie-in.

D. Press the membrane into the sealant making sure there is a complete and continuous seal. Apply weight to the edge of the membrane to prevent possible movement by the wind.

E. Foam Paks may be used as an alternative to the Water Cut-Off or the Pourable Sealer. Follow the instructions given with the Foam Paks.

Note: Mule-Hide does not warrant or guarantee the water tightness of any nightly tie-in. Temporary night seals are the sole responsibility of the roofing contractor.

3.13 Metal Flashings

A. Metal work by others, such as copings, gravel stops, drip aprons, counterflashings and expansion joint covers must be properly fastened and sealed to prevent moisture from entering the roof system. Refer to the Mule-Hide Standard Details.

B. Metal work and securement by others is not covered by the Mule-Hide Warranties.

C. All metal copings, gravel stops and drip aprons must be pre-manufactured systems approved in writing by Mule-Hide prior to job bid date to be included under the Mule-Hide Premium warranty. Mule-Hide must be contacted prior to bid date for recommended manufacturers.

3.14 Walkway Installation

A. Walkways should be provided in areas where routine rooftop maintenance occurs and in areas where regular rooftop traffic is expected. This should include but is not limited to all roof access points such as doors, hatches and ladders and around rooftop mechanical equipment.

B. Mule-Hide recommends the use of rubber walk pads as they may be adhered directly to the roof surface. Do not install walk pads over field seams or flashings.

C. When using masonry paver blocks as walkways, a protection membrane must be installed prior to the pavers. EPDM membrane or polyester slipsheets are acceptable for use as a protection membrane.

D. Mule-Hide does not include the walk pads under the warranty as they are considered maintenance items and are not part of the roof waterproofing.

End of Section

This specification represents the applicable information available at the time of its publication. Mule-Hide reserves the right to change this information at any time. Contact Mule-Hide or check the Mule-Hide website (www.mulehide.com) for the latest updates regarding changes or modifications to this specification.

MULE-HIDE PRODUCTS CO., INC
Fully Adhered Roofing System
SUMMARY SPECIFICATION

EPDM Systems

This Summary Specification is a brief overview of Mule-Hide Product's specification and requirements for a Fully Adhered Mule-Hide EPDM Roofing System and is intended for use as a submittal in a bid package. Specifier's and Mule-Hide Warranty Eligible Contractors must comply with Mule-Hide Product's specifications and requirements prior to design or bid.

Part 1 General

1.01 Description

The Mule-Hide Fully Adhered EPDM Roofing System utilizes a Mule-Hide EPDM membrane in thickness of 45, 60, or 90-mil. Approved insulation is attached to the substrate with either Mule-Hide Insulation fasteners and plates or an approved insulation adhesive, and the EPDM membrane is bonded to the insulation with Bonding Adhesive. The adjoining sheets are overlapped a minimum of 3" and seamed together with tape primer and minimum 3" in-seam tape.

1.02 Quality Assurance

A. The roofing system must be installed by a Mule-Hide Warranty Eligible Contractor in accordance with installation guidelines and detail drawings as approved by Mule-Hide. Prior written approval from the Mule-Hide Warranty Department is required for all deviations from Mule-Hide's published specifications and details.

B. Projects requesting a Labor and Material Warranty will be inspected by a Mule-Hide Representative to verify that Mule-Hide's installation and material requirements have been met.

C. Mule-Hide roofing systems offer a variety of Underwriters Laboratories (UL), Factory Mutual (FM) and other ratings. Consult the appropriate approval guides and Mule-Hide Products for specific code approvals.

1.03 Submittals

A. To ensure compliance with Mule-Hide's warranty requirements contact the Mule-Hide Warranty Department if any of the following conditions exist.
   1. Specified wind speed warranty greater than 55 MPH.
   2. Building height > 100'
   3. Projects located in coastal or high wind zones.
   4. Pressurized buildings
   5. Cold Storage or Freezer Buildings
   6. Membrane exposed to chemicals

B. Submit a completed Warranty Application form to Mule-Hide prior to biding. Also include fastener pullout testing results as required for non-standard substrates.

C. All projects must have a Mule-Hide warranty application number assigned prior to inspection.

1.04 Product Delivery, Storage, and Handling

A. Deliver materials to the job site in original, unopened containers, with the manufacturer's name, brand name and installation instructions.

B. Store all materials in a dry, clean area protected from the elements, as per manufacturer's recommendations.

1.05 Job Conditions

A. All existing wet or damaged roofing materials must be removed and replaced with new materials.

B. All existing phenolic insulation and sprayed-in-place urethane roofs must be removed.

C. The specifier must determine the use and placement of vapor retarders. Consult ASHRAE (American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc.) and NRCA (National Roofing Contractors Association) publications.

E. Coordinate work between all trades to avoid traffic over completed sections of roofing.

1.06 Warranty.

Fees are required for all Labor and Material (System) Warranties. System Warranties must be obtained through a Mule-Hide Warranty Eligible Applicator. All projects requesting a System Warranty must be inspected by a Mule-Hide Representative. Components of the roofing system must be supplied by Mule-Hide. Warranty covers only Mule-Hide supplied materials. Sample warranties are available upon request. Contact Mule-Hide Warranty Department for warranty requirements.

Part 2 Products

2.01 General

A. The components of this roofing system are to be manufactured, supplied, or approved in writing by Mule-Hide Products.

2.02 Membrane

Mule-Hide Black 45, 60, or 90-mil thick, Black or White 60-mil EPDM membrane is used for this system. The membrane is available in a variety of widths up to 20' and in lengths of 100'. Refer to our Product Data Sheet for physical properties and other information.

2.03 Related Materials

Mule-Hide products include: Cured and un-cured Flashings, Bonding Adhesives, EPDM Lap Sealant, Insulation fasteners and discs, Pourable Sealer, All-Purpose Bar, EPDM Walkway Pad, Universal Single Ply Sealant, and other components.

Part 3 Execution

3.01 General

A. Work should begin at the highest point of the roof level and proceed to the lowest point. Work should be completed on a daily bases including flashings, terminations, and daily seals.

B. Prepare the existing roof deck or substrate according to Mule-Hide design guides and full-system specifications prior to applying the new roofing system.

3.02 Roof Deck Criteria

A. A proper substrate shall be provided by the building owner. The structure shall be able to withstand normal construction loads and live loads.

B. Substrate must allow for drainage so that all water is removed within 48 hours after a rain.

3.03 Substrate Preparation

A. Re-cover projects - All wet or damaged materials must be removed and replaced with new materials.

B. Substrate must be clean, level, and smooth so that the insulation lays flat. Fresh applications of bitumen based roof cement must be removed or covered.

3.04 Installation

Refer to the applicable Product Data Sheets and Material Safety Data Sheets for cautions and warnings.

A. Insulation Attachment

Attach roof insulation with Manufacturer supplied roofing fasteners and plates. Attachment rates and insulation requirements will vary depending upon substrate and desired wind uplift. Consult Mule-Hide Warranty Department for attachment requirements.

B. Membrane Installation and Seaming

Place membrane over substrate with minimum 3" overlap at lap seams and positioned so that laps will shed water. Allow membrane to relax. After membrane has relaxed, fold membrane back so that half of the underside is exposed. Apply EPDM Bonding Adhesive as per manufacturer's instructions. Fold back the unbonding half of membrane and repeat bonding procedure. Seal all seams with tape primer and minimum 3" in-seam tape.

C. Additional Membrane Securement

The membrane must be secured at the perimeter of each individual roof area, projection, and any angle change that exceeds 2" per lineal foot. Consult Mule-Hide's published detail drawings.

D. Membrane Flashing

All existing base flashings are to be removed. Install new membrane flashings as per manufactures details and guidelines. Flashings must be terminated along top edge as per appropriate Mule-Hide detail.

E. Other Related Work

1. Walkways should be provided in areas where regular rooftop traffic is expected. Walkways are considered a maintenance item and are excluded from the Mule-Hide warranty.

2. Mule-Hide EPDM Pads are to be installed over clean, dry surfaces, with a minimum 6" spacing over field seams. The Walkway Pad is adhered to the field membrane with pre-applied seam tape.

3. Concrete pavers may be used if installed over one layer of HP Protection Mat.

4. Copings, counter flashing and other metal work shall be fastened to resist wind uplift and prevent buckling. Metal should be sealed to prevent moisture infiltration.

This summary specification represents the applicable information available at time of publication. Mule-Hide reserves the right to change this information at any time. Contact Mule-Hide Products or visit our website at www.mulehide.com for the latest updates, changes, or modifications to this summary specification.