SECTION 07 54 19

POLYVINYL-CHLORIDE ROOFING

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\*\* NOTE TO SPECIFIER \*\* Mule-Hide Products Co., Inc.; Mulehide, Roofing, Polyvinyl-Chloride PVC Roofing, Membrane, Fleece Back, Fully-adhered, Mechanically Attached, KEE, Induction Welding Attachment Method, AeroWeb Adhesive, Reinforced, NonCL1-Reinforced, Flashings, Bonding Adhesives, Sealant, Coated Metal, Fasteners, Discs, One-Part Pourable Sealer, All-Purpose Bar, Walkway Roll, Universal Single Ply Sealant, Vapor Retarder, Wood Blocking, Insulation, Slip Sheet, Metal Flashings, Adhesives, Sealants, Walkways, Drains, Expansion Joints, Pitch Pans, Temporary Tie-Ins.  
This section is based on the products of Mule-Hide Products Co., Inc., which is located at:  
1195 Prince Hall Dr.  
Beloit, WI 53511  
Toll Free Tel: 800-786-1492  
Tel: 608-365-3111  
Fax: 608-365-7852  
Email: [request info (mulehide@mulehide.com)](https://arcat.com/rfi?action=email&company=Mule-Hide%252BProducts%252BCo.%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(07540mul)%253A%2520&coid=34347&spec=07540mul&rep=&fax=608-365-7852)  
Web: <https://www.mulehide.com>   
 [ [Click Here](https://arcat.com/company/mule-hide-products-co-inc-34347) ] for additional information.  
Welcome to MuleHide, the name trusted in roofing since 1906.  
We are commercial roofing experts who are passionate about our industry and serving the great people who work in it. We offer a complete range of premium-quality low-slope roofing products. Our distribution network - stretching from coast to coast and into Canada - ensures you have those products when and where you need them. Most importantly, we provide the technical expertise, support and training you need to complete jobs successfully. Every time.

1. GENERAL

\*\* NOTE TO SPECIFIER \*\*.  
General Design Considerations:  
1. Review local, state and regional codes to determine their impact on the specified Mule-Hide Roofing System.  
2. Verify structural load limitation. In addition, a core cut may be taken to verify weight of existing components when the roofing system is specified for an existing facility.  
2. On new construction projects, especially in cold climate regions, moisture generated due to the construction process could adversely impact various components within the roofing assembly if not addressed. Refer to SPRI Advisory Bulletin included in the Design Reference DR-03-11 Construction Generated Moisture.  
3. Evaluate drainage for compliance with applicable codes. Slopes may be provided by tapering the structure or through use of tapered insulation. A sufficient number of roof drains should also be specified and properly located to allow for positive drainage. Significant ponding that could remain after 48-hours should be eliminated with the addition of auxiliary drains in low areas where ponding is anticipated.  
4. Mule-Hide specifically disclaims responsibility for the design and selection of an adequate drainage system and drain accessories. Selection must be made by the building Owner or the Owner's design professional.  
5. Small incidental areas of ponded water will not impact the performance of this roofing system; however, in accordance with industry standards, the roofing assembly should be designed to prevent ponding of water on the roof for prolonged periods (longer than 48-hours). Good roofing practice dictates proper drainage to prevent possible excessive live load and, in the event of a roof leak, to minimize potential interior damage to the roofing assembly and to the interior of the building.  
6. Specify the removal of existing wet insulation and membrane. Select an appropriate and compatible material as filler for voids created by removal of old insulation or membrane.  
7. Regardless of type of membrane or assembly selected, remove any loose flashings at perimeter, roof drains, and roof penetrations.

* 1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Membrane.
    2. Insulation.
    3. Sheet Metal Flashing and Trim.
    4. Accessories.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 03 30 00 - Cast-in-Place Concrete.
    2. Section 05 31 00 - Steel Decking.
    3. Section 06 10 00 - Rough Carpentry.
    4. Section 07 01 50.19 - Preparation for Re-Roofing.
    5. Section 07 21 00 - Thermal Insulation.
    6. Section 07 25 00 - Weather Barriers.
    7. Section 07 55 63 - Vegetated Protected Membrane Roofing.
    8. Section 07 62 00 - Sheet Metal Flashing and Trim.
    9. Section 07 71 00 - Roof Specialties.
    10. Section 07 72 00 - Roof Accessories.
    11. Section 07 76 00 - Roof Pavers.
    12. Section 07 92 00 - Joint Sealants.
    13. Section 08 45 00 - Translucent Wall and Roof Assemblies.
    14. Section 08 62 00 - Unit Skylights.
    15. Section 22 10 06 - Plumbing Piping Specialties.
    16. Section 26 41 13 - Lightning Protection for Structures.
    17. Section 32 93 00 - Plants.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. American Society of Civil Engineers (ASCE):
       1. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; 2022.
    2. ASTM International (ASTM):
       1. ASTM C518, Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus, 2021.
       2. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2023.
       3. ASTM D4434, Standard Specification for Poly(Vinyl Chloride) Sheet Roofing; 2021.
       4. ASTM D6878 - Standard Specification for Thermoplastic Polyolefin- Based Sheet Roofing; 2021.
    3. Federal Specification:
       1. HH-I-1972, Insulation Board, Thermal Faced, Polyurethane or Polyisocyanurate; Current Edition.
    4. FM Global (FM):
       1. FM (AG) - FM Approval Guide; Current Edition.
       2. FM 1-49, Loss Prevention Data Sheet, Perimeter Flashing, 2025.
       3. FM DS 1-28 - Wind Design; 2015, with Editorial Revision, 2024.
       4. FM DS 1-29 - Roof Deck Securement and Above-Deck Roof Components; 2016, with Editorial Revision (2022).
    5. National Roofing Contractors Association (NRCA):
       1. NRCA (RM) - The NRCA Roofing Manual; 2025.
    6. Sheet Metal and Air Conditioning Contractors National Association (SMACNA):
       1. Architectural Sheet Metal Manual, Current Edition.
    7. Single Ply Roofing Industry (SPRI):
       1. SPRI Advisory Bulletin, Construction-Generated Moisture and its Effect on Roofing Systems; Current Edition.
    8. Underwriters Laboratories (UL):
       1. UL (DIR) - Online Certifications Directory; Current Edition.
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00.
     2. Product Data:
        1. Manufacturer's data sheets and specifications on each product used, including but not limited to vapor retarder, insulation, slip sheet, fasteners, membrane, membrane flashings, metal flashings, adhesives, sealants, walkways, pavers, and accessory items.
        2. Manufacturer's guide specifications.
        3. Manufacturer's written preparation and installation instructions.
        4. Manufacturer's written recommendations for insulation use and attachment.
        5. Storage and handling requirements.
        6. Operation and maintenance manuals.
     3. Samples: Two samples of each material type to be used in roofing system.
     4. Dimensioned Shop Drawings: Include details of materials, construction, and finish. Include:
        1. Outline of roof.
        2. Details for flashings and terminations.
        3. Joint or termination details and conditions.
        4. Show relationship with adjacent construction.
        5. Show interface with related systems and materials.
        6. Include setting plan for insulation.
        7. Include mechanical fastener layout.
        8. Show paver layout.
     5. Manufacturer's Certificate: Certify roofing products and accessories meet or exceed specified requirements.
     6. Certification from insulation, roofing and accessory component manufacturers that materials supplied comply with identified ASTM and industry standards.
     7. Verification that system specifications meet Code and insurance requirements, including but not limited to:
        1. Factory Mutual Research Laboratories.
        2. Underwriters Laboratories.
     8. Sustainable design documentation.
     9. Installers qualification statement.
     10. Testing firm's qualification statement.
     11. Pullout Tests:
         1. Submit copy of tests.
         2. Submit copy of manufacturer's review of tests.
     12. Sample Warranty.

\*\* NOTE TO SPECIFIER \*\*.  
Manufacturer On-Site Warranty Inspection is only required when specifying a full-system warranty. Manufacturer On-Site Inspection is not required for Roofing Membrane Limited Warranty.

* + 1. Manufacturer's On-Site Warranty Inspection Report for Full-System Warranties: Submit manufacturer's on-site inspection report detailing inspection and confirming system is installed in accordance with manufacturer's written and warranty requirements.
    2. Warranty Application:
       1. Prior to commencement of Work, submit Warranty Application to manufacturer's technical department for review and approval.
       2. Complete Warranty Application and include copy of written roof specification from Contract Documents.
       3. Include requests for deviation from manufacturer's standard written specifications and details.
       4. Include roof drawings showing dimensions and locations of penetrations.
  1. QUALITY ASSURANCE

\*\* NOTE TO SPECIFIER \*\*.  
Install the Mule-Hide PVC Roofing Systems using an independent roofing contractor eligible (Warranty Eligible) to apply for Mule-Hide system warranties when System Warranties are requested.  
No deviations are permitted from the Contract Documents or the Mule-Hide Products Co., Inc. (Mule-Hide) standard details without prior written approval from Mule-Hide's Warranty Department.  
Upon completion of the installation and according to the terms and conditions stated in this specification, in accordance to the information given in the Warranty Application and Pre-Job Survey Form, and in compliance with additional approvals given by Mule-Hide, an authorized representative of Mule- Hide to perform an on-site inspection of the roof (commercial projects only) to verify that installation and material requirements have been met.  
Inspections are only conducted on projects where a System Warranty is requested. Inspections are not conducted on projects not requiring a Mule-Hide Warranty or when only a Roofing Membrane Limited Warranty is requested. The sole purpose of an inspection by a Mule-Hide Representative is not to be a final inspection for the benefit of the building Owner/Owner's Representative. The manufacturer's inspection is for the benefit of Mule-Hide to determine if a System Warranty may be offered for the project.  
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. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum of 5- years documented experience.
    2. Installer Qualifications: Manufacturer approved Independent Warranty Eligible Contractor specializing in performance of the Work of this section on projects of similar scope and complexity.
    3. Obtain written approval from manufacturer and manufacturer's Warranty Department for deviations from manufacturer's written requirements.

\*\* NOTE TO SPECIFIER \*\*.  
Manufacturer On-Site Warranty Inspection is only required when specifying a Full System Warranty. Manufacturer On-Site Inspection is not required for Roofing Membrane Limited Warranty.

* + 1. Manufacturer On-Site Warranty Inspection for Full-System Warranties: Require manufacturer's authorized representative to perform an on-site inspection of roof to verify installation requirements have been met. Provide inspection report.
    2. Testing Firm Qualifications: Company specializing in performance of the testing specified and approved by manufacturer.
    3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity. Alternate accessory products only as approved by roofing manufacturer.
    4. Pullout Tests:
       1. Conduct pullout tests in accordance with manufacturer's written requirements to verify condition of deck or substrate and to confirm system design pullout values.
       2. Perform additional tests in areas where integrity of deck is questionable.
       3. Submit written report of test results to manufacturer's warranty department for review.
       4. Submit copy of reports and manufacturer's review of report to Architect.
    5. Do not install mechanically attached systems over oriented strand board (OSB) without prior written approval from the manufacturer.
    6. Coordinate with installation of associated Work installed under other sections and with other trades.
  1. PRE-INSTALLATION CONFERENCE
     1. Conduct pre-installation conference a minimum of 1-week prior to scheduled commencement of the Work.
        1. Attendees to include Owner or Owner's Representative, Architect, Consultant, Contractor and trades related to roofing system Work.
     2. Agenda to include, but not limited to:
        1. Schedule.
        2. Responsibilities.
        3. Preparation.
        4. Installation procedures.
        5. Interface with related construction.
        6. Coordination of related work.
  2. DELIVERY, STORAGE, AND HANDLING

\*\* NOTE TO SPECIFIER \*\*.  
On projects where the Fully Adhered PVC Fleece Back or PVC KEE HP Fleece Back System is specified, it is the responsibility of the independent roofing contractor to verify the condition of the deck or substrate and confirm roof deck can withstand the additional load.

* + 1. Deliver materials in manufacturer's original unopened containers or wrappings, clearly labeled with manufacturer's name, product identification, and date of manufacture.
    2. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
    3. Protection:
       1. Protect materials from damage during transit, storage, and delivery to site.
       2. Place materials on pallets and protect from moisture.
       3. Protect from damage due to weather, excessive temperatures, and construction operations.
       4. Protect insulation in accordance with manufacturer's written instructions.
    4. Storage:
       1. Store materials in dry, clean area, clear of ground and moisture, and protected from weather.
       2. Store rolls of membrane flat on pallets.
       3. Store adhesive, caulking, solvents, sealants and membrane at temperatures between 60 Degrees F and 80 Degrees F until immediately prior to use.
       4. Store flammable materials in accordance with the requirements of the Authorities Having Jurisdiction.
       5. Ensure storage of materials does not exceed static and dynamic load-bearing capacities of roof decking.
    5. Replace materials damaged due to improper storage with new materials.
  1. PROJECT CONDITIONS
     1. Maintain environmental conditions within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside of manufacturer's recommended limits.
     2. Contact manufacturer's warranty department for additional requirements if any of the following conditions exist:
        1. Specified wind speed warranty greater than 55 MPH.
        2. Building height greater than 50 feet (15.2 m).
        3. Project located in coastal or high wind zones.
        4. Pressurized buildings.
        5. Cold Storage or Freezer Buildings.
        6. Membrane exposed to chemicals.
        7. Required installation on OSB roof deck.
        8. If Roof System should exceed the structural load conditions as determined by the Architect or Engineer.
        9. If chemical or hazardous materials are discharged onto roof system.
     3. Install only as much roofing as can be made watertight by end of workday. This includes flashing work.
  2. WARRANTY

\*\* NOTE TO SPECIFIER \*\*.  
Roofing Membrane Limited Warranty for Commercial Projects.  
The Roofing Membrane Limited Warranty (Warranty) covers only the Mule-Hide 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.  
Standard System Warranty.  
The Standard warranty is an NDL (No Dollar Limit), labor and material warranty that covers only the Mule-Hide labeled membrane and accessories that comprise the Mule-Hide Roof System, other components supplied or approved in writing by Mule-Hide and exclusively installed by an independent Mule-Hide Warranty Eligible Contractor. Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Standard warranties require inspections by a Mule-Hide representative.  
Premium System Warranty.  
The Premium warranty is an NDL (No Dollar Limit), labor and material warranty that covers only the Mule-Hide labeled membrane, insulation and accessories or components supplied or approved in writing by Mule-Hide and exclusively installed by an independent Mule-Hide Warranty Eligible Contractor.  
Applicator must submit a Warranty Application and the appropriate fee to Mule-Hide. Premium warranties require inspections by a Mule-Hide representative.  
Available term limits from 10-, 15-, 20-, 25-, 30-years.  
- Fleece Back PVC 115 mil: 10-years, 15-years, 20-years.  
- Fleece Back PVC KEE 105 mil: 10- years, 15-years, 20 years.  
- Fleece Back PVC 135 mil: 25-years.  
- Fleece Back PVC KEE 115 mil: 25 years.  
- Fleece Back PVC KEE 135-mil: 30-years.  
Extended wind speed and hail coverage available.  
Consult manufacturer's detailed requirements and Warranty Tables for:  
- Specific system warranty options, insulation and cover board, and required attachments for assemblies warrantied up to 20-years,.  
- Insulation and cover board and required attachment for assemblies with 25- or 30-year warranty term.  
- Adhesive/bead spacing for Fleece Back Membrane installations.  
- Minimum perimeter width.  
To ensure compliance with Mule-Hide's warranty requirements, contact Mule-Hide Warranty Department if any of the following conditions exist.  
1. Specified wind speed warranty greater than 55 MPH.  
2. Building height > 50 feet (15.2 m).  
3. Projects located in coastal or high wind zones.  
4. Pressurized buildings.  
5. Cold Storage or Freezer Buildings.  
6. Membrane exposed to chemicals.  
7. OSB roof deck.  
Mule-Hide is under no obligation to issue warranties on projects completed prior to submittal to the Mule- Hide Technical Department of a properly completed Warranty Application.  
Metal flashing products supplied by Mule-Hide (Mule-Hide Metal Accessories) and installed by a Mule- Hide Warranty Eligible Applicator will be covered under a Standard or Premium System warranty.  
The finishes on the Mule-Hide labeled metal components are covered for a maximum warranty period up to 25 years independent of the terms of the issued warranty (see the Mule-Hide 25-year Limited Metal Warranty for specific warranty coverage).  
Standard and Premium System warranties are not available for residential projects.  
PVC tie-ins are not covered by Mule-Hide warranties.  
Contact Mule-Hide Technical Department for other extended warranties that may be available.  
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.  
Consult Manufacturer's Warranty Information here: https://www.mulehide.com/Search?q=Warranty to determine appropriate warranty for your project.

* + 1. Manufacturer's \_\_\_\_-year Roofing Membrane Limited Warranty for Commercial Projects.
    2. Manufacturer's \_\_\_\_-year Standard System Warranty.
    3. Manufacturer's \_\_\_\_-year Premium System Warranty.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Mule-Hide Products Co., Inc., which is located at:  
         1195 Prince Hall Dr.  
         Beloit, WI 53511  
         Toll Free Tel: 800-786-1492  
         Tel: 608-365-3111  
         Fax: 608-365-7852  
         Email: [request info (mulehide@mulehide.com)](https://arcat.com/rfi?action=email&company=Mule-Hide%252BProducts%252BCo.%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(07540mul)%253A%2520&coid=34347&spec=07540mul&rep=&fax=608-365-7852);Web: <https://www.mulehide.com>

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00, Product Requirements.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required.

* 1. PERFORMANCE AND DESIGN REQUIREMENTS
     1. Solar Reflectance Index (SRI): \_\_\_\_.
     2. Roof-Ceiling Fire Resistance Rating: Comply with UL (DIR), Assembly Design No. \_\_\_.

\*\* NOTE TO SPECIFIER \*\* Delete options below not required.

* + 1. Roof Covering External Fire Resistance Classification: Class \_\_\_ when tested in accordance with \_\_\_.
    2. Wind Uplift: In accordance with ASCE 7 and the Authorities Having Jurisdiction.
    3. Factory Mutual Classification: \_\_\_.
    4. Insulation Thermal Resistance (R-Value): Provide R-Value over entire roof deck in accordance with the Authorities Having Jurisdiction.
       1. R-Value: \_\_\_\_.
    5. Drainage: No standing water within \_\_\_\_-hours after precipitation.
  1. MEMBRANE

\*\* NOTE TO SPECIFIER \*\*.  
The Mule-Hide Reinforced PVC Membrane is available 50 mils (.050 inches) thick, 60 mils (.060 inches) thick or 80 mils (.080 inches) thick. The Mule-Hide PVC membrane is a polyester scrim reinforced thermoplastic roofing membrane that meets and exceeds the requirements of ASTM D4434 (Type III) Standard Specification for Poly (Vinyl Chloride) Sheet Roofing. Refer to the Product Data Sheets for physical properties and additional information.  
The Mule-Hide Reinforced PVC KEE HP Membrane is available 50 mils (.050 inches) thick, 60 mils (.060 inches) thick or 80 mils (.080 inches) thick. Mule-Hide PVC KEE HP (High Performance) Membrane is manufactured using DuPont Elvaloy resin modifier and provides outstanding thermal stability and flexibility, extended upper and lower temperature performance limits and enhanced chemical resistance. The physical properties of the membrane are enhanced by a tenacious, weft-inserted polyester fabric. Meets or exceeds all requirements of ASTM 4434, Type III and/or Type IV. The Mule-Hide Reinforced.  
PVC Fleece Back Membrane is available in 115 mils and 135 mils total thickness. Mule-Hide PVC Fleece Back Membranes are manufactured using a state-of-the-art extrusion process that ensures complete scrim encapsulation. The PVC membrane is reinforced with a high-strength fiberglass scrim and is enhanced with a fleece backing, resulting in a very tough, durable and versatile sheet. Fiberglass reinforcement provides additional dimensional stability for the sheet, while the fleece backing enhances the sheets puncture resistance and acts as a built-in separation layer for rough or asphaltic surfaces. Meets or exceeds all requirements of ASTM D4434, Type III. Refer to the Product Data Sheets for physical properties and additional information.  
The Mule-Hide Reinforced PVC KEE HP Fleece Back Membrane is available in 105 mils (FB-50), 115 mils (FB- 60), and 135 mils (FB-80) total thickness. Mule-Hide PVC KEE HP Fleece Back Membrane is used in fully adhered roofing systems in new construction, reroofing and recover (retrofit) applications. Polyester fleece backing enhances the puncture resistance of the membrane and can also serve as a built-in separation layer for rough surfaces or existing asphalt-based roofing systems. The system must be installed over acceptable roof insulation or other suitable substrate. Refer to the Product Data Sheets for physical properties and additional information. Reference Product Data Sheets for physical properties and additional information.

* + 1. Reinforced PVC Membrane, ASTM D4434 (Type III):
       1. Basis-of-Design: Mule-Hide Reinforced PVC Self Adhering Membrane; www.mulehide.com.
       2. Thickness:
          1. 50-mil (0.050 inch).
          2. 60-mil (0.060 inch).
          3. 80-mil (0.080 inch).
    2. Fleece Back, Reinforced PVC Membrane, ASTM D4434, Type III:
       1. Basis-of-Design: Mule-Hide Reinforced PVC Self Adhering Membrane; www.mulehide.com.
       2. Total Thickness:
          1. 115-mil (0.115 inch).
          2. 135-mil (0.135 inch).
    3. Reinforced PVC Kee HP Membrane: High performance membrane utilizing resin modifier and weft-inserted polyester fabric, ASTM D4434 (Type III and/or Type IV).
       1. Basis-of-Design: Mule-Hide PVC KEE HP, Fully Adhered; www.mulhide.com.
          1. Thickness:

50-mil (0.050 inch).

60-mil (0.060 inch).

80-mil (0.080 inch).

* + 1. Fleece Back, Reinforced PVC KEE HP Membrane: High performance membrane utilizing resin modifier and weft-inserted polyester fabric.
       1. Basis-of-Design: Mule-Hide PVC KEE HP, Fully Adhered; www.mulhide.com.
          1. Thickness:

105-mil (0.105 inch).

115-mil (0.115 inch).

135-mil (0.125 inch).

\*\* NOTE TO SPECIFIER \*\*.  
Delete articles not required.  
Premium Warranties require the use of manufacturer labeled insulation or insulation approved by manufacturer. If you are specifying a premium warranty, contact the manufacturer's technical department for specific requirements.  
If project is subject to compliance with UL for FM requirements, components may change with slope, deck type, and classification requested. Contact manufacturer's technical department for guidance.  
UL and FM Approved Assemblies: Contact Mule-Hide Technical Department for proper insulated assemblies when projects require compliance with UL or FM requirements. The components may change with the slope, deck type and classification requested.

* 1. INSULATION
     1. See Section 07 21 00, Thermal Insulation.
     2. Protection layer over existing substrate to obtain desired thermal Value.
     3. Compatible with manufacturer's membranes, adhesives, flashings, and accessories and approved by manufacturer in writing.

\*\* NOTE TO SPECIFIER \*\*.  
Premium warranties require use of manufacturer labeled insulation or insulation by an approved manufacturer. If a premium warranty is specified, contact manufacturer's technical department for specific requirements.  
Contact Mule-Hide Technical Department for proper insulated assemblies when projects require compliance with UL or FM requirements. The components may change with the slope, deck type and classification requested.

* + 1. Acceptable Insulation Boards:
       1. Polyisocyanurate:
          1. With non-asphaltic facers. Foil facers are not acceptable.
          2. Meeting physical property requirements of Fed. Spec HH-I-1972.
          3. Compressive Resistance: 18 psi.
          4. Thickness: Minimum 1 inch (25.40 mm) or greater as required by insulation manufacturer to span steel deck flutes.
          5. Basis-of-Design: \_\_\_\_\_\_\_\_\_.
       2. High Density Polyisocyanurate:
          1. Closed-cell polyisocyanurate foam core laminated to premium performance coated glass fiber felt facers.
          2. Type:

Flat.

Tapered.

* + - * 1. Thickness: 1/2 inch (12.70 mm).
        2. 100 psi.
        3. Basis-of-Design: Poly ISO 1-HD; www.mulehide.com.

\*\* NOTE TO SPECIFIER \*\* Minimum thicknesses may vary with wind requirements and deck types. Consult manufacturer.

* + - 1. High Density Wood Fiberboard:
         1. Used as overlay over other insulations.
         2. Thickness:

Used as an Overlay: Minimum 1/2 inch (12.70 mm).

Over Steel Decks: Minimum 1 inch (25.40 mm).

Over Wood or Concrete Deck: Minimum 1/2 inch (12.70 mm).

* + - * 1. Basis-of-Design: \_\_\_\_\_\_\_\_\_.
      1. Expanded Polystyrene (EPS).
         1. Board Density: 1.25 PCF certified minimum meeting ASTM C578.
         2. Type: II.
         3. Thickness:

Minimum 1 inch (25.40 mm).

Over Steel Deck: As required by insulation manufacturer to span flutes.

\*\* NOTE TO SPECIFIER \*\* Consult building Code to ensure whether a layer of gypsum board is required under EPS insulation on steel decks. If required, add it here.

Required Overlay:

Minimum 1/2 inch (12.70 mm) High Density Wood Fiberboard.

Basis-of-Design: \_\_\_\_\_\_\_\_\_.

Minimum 1 inch (25.40 mm) polyisocyanurate insulation.

Basis-of-Design: \_\_\_\_\_\_\_\_\_.

Minimum 1/4 inch (6.35 mm) Rigid Gypsum Roof Board:

Basis-of-Design: DensDeck; www.buildgp.com.

Minimum 1/4 inch (6.35 mm) Gypsum Fiber Roof Board:

Basis-of-Design: Securock; www.usg.com.

* + - 1. Extruded Polystyrene (XPS):
         1. Meeting ASTM C578.
         2. Type:

IV.

VI.

VII.

* + - * 1. Thickness:

Minimum 1 inch (25.40 mm).

Over Steel Deck: As required by insulation manufacturer to span flutes.

\*\* NOTE TO SPECIFIER \*\* Consult building Code to ensure whether a layer of gypsum board is required under EPS insulation on steel decks. If required, add it here.

Required Overlay:

Minimum 1/2 inch (12.70 mm) High Density Wood Fiberboard.

Basis-of-Design: \_\_\_\_\_\_\_\_\_.

Minimum 1 inch (25.40 mm) polyisocyanurate insulation.

Basis-of-Design: \_\_\_\_\_\_\_\_\_.

Minimum 1/4 inch (6.35 mm) Rigid Gypsum Roof Board:

Basis-of-Design: DensDeck; www.buildgp.com.

Minimum 1/4 inch (6.35 mm) Gypsum Fiber Roof Board:

Basis-of-Design: Securock; www.usg.com.

\*\* NOTE TO SPECIFIER \*\* Perlite may only be used as fill insulation under an approved insulation. PVC or PVC Fleece Back or PVC KEE HP Fleece Back cannot be adhered directly to Perlite insulation.

* + - 1. Perlite:
         1. Perlite is not permitted as top layer insulation.
      2. Approved Roof Board Overlays:
         1. Minimum 1/4 inch (6.35 mm) thick layer may be used as an overlay over approved insulation or as thermal barrier over a combustible deck.

Minimum 1/4 inch (6.35 mm) Rigid Gypsum Roof Board:

Basis-of-Design: DensDeck; www.buildgp.com.

Minimum 1/4 inch (6.35 mm) Rigid Gypsum Roof Board:

Basis-of-Design: DensDeck Prime; www.buildgp.com.

Minimum 1/4 inch (6.35 mm) Gypsum Fiber Roof Board:

Basis-of-Design: Securock; www.usg.com.

* + 1. Comply with manufacturer's written recommendations for use and attachment.

\*\* NOTE TO SPECIFIER \*\*.  
Metal flashing products supplied by Mule-Hide (Mule-Hide Metal Accessories) and installed by a Mule-Hide Warranty Eligible Contractor will be covered under a Standard or Premium System Warranty.  
Sheet metal components supplied by others are not covered by the Mule-Hide warranties.

* 1. SHEET METAL FLASHING AND TRIM
     1. See Section 07 62 00, Sheet Metal Flashing and Trim.
     2. Fabricate and install PVC Coated Metal and non-coated metal components including, but not limited to gravel stops, drip aprons, counterflashings, and copings in accordance with ES-1 recommendations and requirements.
     3. Fabricate and install metal components in accordance with ES-1 recommendations and requirements.
  2. ACCESSORIES
     1. Adhesives:

\*\* NOTE TO SPECIFIER \*\*.  
Helix Adhesive:  
Depending on packaging and delivery option selected, these products can be installed in continuous beads, full spray, or splatter applications.  
Not all products have the same options, so review of the product data sheets is required to ensure proper use.

* + - 1. Helix Max Low Rise Adhesive: Two-component, low rise, construction grade, polyurethane foam adhesive; www.mulehide.com.

\*\* NOTE TO SPECIFIER \*\*.  
HydroBond Adhesive:  
Designed to bond PVC membranes to a clean, dry horizontal surface as a wet lay-in adhesive with slopes up to 2: 12.  
Can be used with standard PVC, PVC Fleece Back and PVC KEE HP Fleece Back membranes. It cannot be used with standard PVC KEE HP membrane.  
This product can also be used as a contact adhesive for vertical applications, such as flashings.  
This water-based adhesive is specially formulated to be in compliance with the State of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC limitations. This product also meets the requirements of the OTC Model Rule for Single Ply Roofing Adhesive.

* + - 1. HydroBond: Water-Based PVC Bonding Adhesive; www.mulehide.com.

\*\* NOTE TO SPECIFIER \*\*.  
Formulated using a blend of VOC-exempt and non-exempt solvents to be in compliance with the state of California Clean Air Act of 1988 (updated in 1997) and as further regulated by California's Air Quality Control Districts listing VOC limitations.  
This product meets the 50 gpl VOC content requirements of the OTC Model Rule for Single Ply Roofing Adhesive.  
This adhesive to be used for flashings only and not to adhere the Fleece Back or PVC KEE HP Fleece Back membrane.

* + - 1. Low-VOC Bonding Adhesive; www.mulehide.com.
         1. High strength solvent-based contact adhesive for bonding of PVC membrane to various porous and non-porous substrates.
         2. VOC Content: Less than 250 gpl.
         3. Used for flashings only and not to adhere to Membrane.
      2. AeroWeb Low-VOC Aerosol Contact Adhesive/Primer; www.mulehide.com.
         1. Low VOC contact adhesive used to adhere membrane to various substates and prime surfaces prior to application of F5 Air and Vapor Barrier.
    1. Flashing:
       1. PVC Flashing; www.mulehide.com.
          1. Non-reinforced material to seal details where field fabrication is necessary including, but not limited to, drain details, pipe flashings, pitch pocket flashings, and seaming joints of PVC Coated Metal, or where reinforced membrane is not practical.
          2. Thickness: 0.080 inch (2.03 mm) thick.
    2. Termination Caulk: www.mulehide.com.
       1. Single component, non-sag elastomeric polyurethane caulk as approved by membrane manufacturer.
    3. Aluminum Foil Tape: www.mulhide.com.
       1. 3-mil tape with acrylic adhesive used over PVC roofing system metal joints prior to PVC flashing strip welding over joints. As approved by membrane manufacturer.
    4. PVC Universal Corners; www.mulehide.com.
       1. Pre-molded, non-reinforced PVC material for water tightness at corners formed by PVC Coated Metal and flashing membrane.
       2. Thickness: 0.060 inch (1.52 mm).
       3. Color: White.
    5. PVC Outside Corners; www.mulehide.com.
       1. Pre-molded for flashing outside corners.
       2. Color:
          1. White.
          2. Gray.
          3. Tan.
    6. PVC Inside Corners:
       1. Pre-molded for flashing inside corners.
       2. Color:
          1. White.
          2. Gray.
          3. Tan.
    7. PVC Membrane Cleaner; www.mulehide.com.
       1. For cleaning aged PVC AND PVC KEE HP membrane prior to welding process.
       2. Cleaner leaves a suitable surface for application of Primer.
    8. PVC Molded Pipe Seal; www.mulehide.com.
       1. Injection molded, pre-formed flashing for pipes.
       2. Non-reinforced PVC material.

\*\* NOTE TO SPECIFIER \*\*.  
PVC Split Pipe Seals for pipes 1 inch (25.40 mm) to 6 inches (152.40 mm) in diameter.

* + 1. PVC Split Pipe Seals; www.mulehide.com:
       1. Fabricated flashings of 60-mil reinforced PVC membrane for pipes 1 to 6 inches (25.40 to 152.40 mm) in diameter.
    2. PVC Square Tubing Wraps; www.mulehide.com:
       1. Square penetration flashings, 60-mil reinforced PVC membrane.
       2. Overall Flashing Height: 11 inches (279.40 mm).
       3. Color:
          1. White.
          2. Gray.
          3. Tan.

\*\* NOTE TO SPECIFIER \*\*.  
PVC Joint Covers are mandatory for 60-mil and 80-mil PVC Systems and all systems with warranties longer than 15-years.

* + 1. PVC T-Joint Cover; www.mulehide.com.
       1. Non-reinforced flashing for sealing step-offs at splice intersections.
       2. 60-mil thick cut into 4-1/2 inches (114.30 mm) diameter circles.
    2. Prefabricated Metal Accessories: www.mulehide.com.
       1. Skirted Metal Edge in Basic Configurations; www.mulehide.com.
          1. Standard skirted edge.
          2. T-Edge.
          3. T-Edge Plus.
          4. Edge Face:

Coated metal with factory welded integrated skirt.

Kynar coated with factory welded integrated skirt.

* + - 1. Coated metal scuppers.
      2. Pourable sealer pan.
      3. Gutters.
      4. Copings.
    1. PVC Coated Metal; www.mulehide.com.
       1. 24-gauge, galvanized steel laminated with 35-mil (0.035 inch thick) non-reinforced PVC Membrane for flashing and edge metal detailing.
    2. All-Purpose Bar (A-P Bar); www.mulehide.com.
       1. Extruded aluminum bar:
       2. Thickness: 50 mils (0.050 inch) thick.
       3. To terminate adhered reinforced membrane vertical flashings in certain conditions.
       4. May be used to anchor field sheet at base of vertical angle changes.
    3. Membrane Fasteners and Plates; www.mulehide.com.
       1. As supplied and approved by manufacturer for specific job conditions and substrates.
       2. Steel/Wood Deck Fasteners:
          1. Drill Point-Coated.
          2. Thread Point-Coated.
          3. Stainless Steel Drill Point.
       3. Concrete Fasteners - For Structural Concrete Decks:
          1. TL: 2-piece high density nylon auger and metal plate for cementitious fiber substrates and lightweight concrete or gypsum decks.
       4. Metal Plates:
          1. As provided and approved by manufacturer.
    4. Induction Weld Plates; www.mulehide.com.
       1. For attachment of insulation or coverboards to deck while providing non-mechanical attachment of PVC single-ply membranes using an induction weld bond to the induction weld plate.
       2. For use on heat welded membranes with steel, wood, or structural concrete decks.
       3. Size: 3-3/8 inches (85.73 mm) diameter.
       4. Install using PVC specific induction welding plate.
       5. Fasteners:
          1. #15 EHD.
          2. Tru-Spike Fasteners.
          3. PFC Purlin Drill Point Fasteners.
    5. Thermoplastic One-Part Pourable Sealer; www.mulehide.com.
       1. One-component thermoplastic sealant for pitch pockets.
    6. PVC Cut Edge Sealant; www.mulehide.com.
       1. Solvent-based liquid sealant to seal cut edge of membrane.

\*\* NOTE TO SPECIFIER \*\*.  
Mule-Hide specifications require the use of such a product in walkway concentration points (i.e., roof hatches, access doors, rooftop ladders, etc.) regardless of traffic frequency. Walkways must also be installed if regular maintenance (once a month or more) is necessary to service rooftop equipment.

* + 1. PVC Walkway Rolls; www.mulehide.com.
       1. Thickness:
          1. 80-mil (0.080 inch).
          2. 90 mil (0.090 inch).
       2. Diamond plate tread pattern of polyester reinforced PVC.
       3. Welded directly to roofing membrane.
       4. Color: Gray.
    2. Slip Sheet; www.mulehide.com.
       1. Laminated Kraft paper with fiberglass scrim reinforcement.
    3. Protective Mat; www.mulehide.com.
       1. UV resistant polypropylene needle punched fabric.
       2. Used above membrane as slipsheet for protection from damage.

\*\* NOTE TO SPECIFIER \*\*.  
Mule-Hide does not require a vapor retarder for protection of membrane; however, it should be considered by the specifier for the protection of the roofing assembly (i.e. primarily insulation, underlayment and adhesives). The following criteria should be considered by the specifier:  
Use of a vapor retarder to protect insulation and reduce moisture accumulation within an insulated roofing assembly, should be investigated by the specifier. Consult latest publications by ASHRAE (American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.), NRCA (National Roofing Contractors Association), local building and energy codes for specific information.  
In the generally temperate climate of the United States, during the winter months, water vapor flows upward from a heated, more humid interior toward a colder, drier exterior. Vapor retarders are more commonly required in northern climates than in southern regions, where downward vapor pressure may be expected and the roofing membrane itself becomes the vapor retarder.  
On cold storage/freezer facilities, the perimeter and penetration details must be selected to provide an air seal and prevent outside air from infiltrating and condensing within the roofing assembly.  
When a vapor retarder is specified, Mule-Hide F5 Air & Vapor Barrier may be used. Refer to the F5 Air & Vapor Barrier Product Data Sheet for product installation.  
On structural concrete decks, when a vapor retarder is not used, gaps in the deck along the perimeter and around penetrations must be sealed. If tilt-up panels are present, vertical joints between panels must be sealed as well. Sealing these areas will help prevent infiltration of hot humid air and possible moisture contamination resulting from condensation. This is specifically important when adhesive is used to attach the roof insulation.

* + 1. Vapor Retarder:
       1. Thickness: 40 mils.
          1. Composite consisting of 35 mil self-adhering rubberized asphalt membrane laminated to 5 mil UV resistant poly film with anti-skid surface.
       2. Compatible with insulation and other accessories.
       3. White poly film for summer exposure.
       4. Black poly film for winter exposure.
       5. Air and vapor barrier may function as a temporary roof for up to 120-days.
       6. Product:
          1. F5 Air and Vapor Barrier; www.mulehide.com.
          2. Alternate product approved in writing by Architect and Manufacturer.
    2. Other Vapor Retarders:
       1. Provide vapor retarders compatible with insulation and other accessories and approved by Architect.
    3. Wood Nailers:
       1. #2 or better lumber, pressure treated for rot resistance.
          1. Height sufficient to match thickness of insulation.
          2. Creosote and asphaltic preservatives are not acceptable.
       2. Conform to Factory Mutual's Loss Prevention Data Sheet 1-49.
       3. Provide nailers of a height sufficient to match thickness of insulation.

1. EXECUTION
   1. GENERAL
      1. Comply with manufacturer's written installation instructions for materials, components and accessories and install in accordance with warranty requirements, approved submittals, NRCA (RM) applicable requirements, and in proper relationship with adjacent construction.
      2. Prior to and during installation, remove dirt, debris, and dust from surfaces to be roofed for both new and reroofing substrates.

\*\* NOTE TO SPECIFIER \*\*.  
The Mule-Hide PVC Fleece Back or PVC KEE HP Fleece Back Roof System must be installed in temperatures 40 degrees F and rising for 72 consecutive hours when using HydroBond Water-Based PVC Bonding Adhesive to prevent it from freezing before fully curing.

* + 1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install roofing products or accessories under environmental conditions outside manufacturer's recommended limits.
    2. Do not install materials until substrates and surfaces are properly prepared, clean, and thoroughly dry in accordance with manufacturer's written instructions. Should surface moisture occur, provide adequate equipment to dry substrate prior to application of new material.
    3. Do not expose materials vulnerable to water or sun damage in quantities greater than can be installed and weatherproofed in the same day.
    4. Perform test cuts at each roof area prior to re-roofing.
    5. Schedule the Work so new roofing is installed and made watertight in the same day, including flashings.
    6. Leave no partially completed Work exposed at the end of the workday.
    7. Take precautions to prevent wind blow-off or wind damage during the Work.
    8. Provide securement of temporary constructions, materials, and equipment.
    9. Verify roof drain lines are unblocked before commencement of Work. Report blockages the Architect and manufacturer's technical department in writing.
    10. Install temporary waterstops at the end of each day's work. Remove temporary waterstops at the start of the next day's work and dispose. Provide material compatible waterstops.

\*\* NOTE TO SPECIFIER \*\*.  
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 requires a separation layer of insulation a minimum of 1-1/2 inches (38.10 mm) thick and having a minimum R-value of 5.0 if the coal tar pitch is 10-years or older.  
All joints must be butted tightly together or have joints completely taped to prevent volatiles from damaging roof membrane.  
If existing assembly is less than 10-years old, specific procedures must be followed. Contact Mule- Hide Customer Service Department for specific requirements.

* + 1. Do not install membrane in direct contact with products containing coal tar pitch, creosote or penta-based materials. Consult manufacturer for special installation requirements.
    2. Comply with safety regulations of the Authorities Having Jurisdiction.
    3. Do not use oil-based paint on Coated Metal or membrane. Contact manufacturer's Technical Department for recommendations.
    4. Do not allow muriatic acid masonry cleaner to come in direct contact with Membrane or accessory products.
    5. Do not allow membranes or accessories to come into direct contact with steam or vents that produce temperatures in excess of 160 Degrees F (71 Degrees C).
    6. Do not allow contaminants, including but not limited to petroleum, grease, acid, solvents, vegetable or mineral oil, animal oil, and animal fat or direct steam venting to come into direct contact with the PVC Roofing Membrane. Contact manufacturer if these conditions exist.
    7. Employ wind barriers in conditions that may affect quality of sprayed polyurethane adhesive and to prevent possible overspray.
    8. When using Hydrobond adhesive, membrane must be installed in temperatures of 40 Degrees F and rising for 72 consecutive hours to prevent adhesive from freezing until fully cured.
    9. Do not apply Helix Max Low-Rise Adhesive during periods of inclement weather. Comply with manufacturer's requirements for application temperatures and humidity levels.
       1. Do not apply when surfaces or ambient temperatures are below 25 Degrees F.
    10. In colder temperatures when the ambient temperature is near the dew point, condensation may form on tape primer and adhesive as solvents flash off. If condensation occurs, discontinue application and allow surface to dry. Do not attempt to dry surface with heat guns or torches. When weather permits apply a new coat of product.
    11. Execute the Work without exposing interior building areas to the effects of inclement weather. Protect existing building against risks.
    12. Sequence Work to avoid use of newly constructed roofing for storage, walking surfaces, and equipment movement.
        1. Provide necessary protection and barriers to segregate work areas and prevent damage to adjacent areas.
        2. If excessive traffic over newly installed membrane is necessary, provide plywood or polyester felt protection to prevent damage.
        3. Replace damaged materials with new materials.
    13. Report unusual or concealed conditions discovered during the Work immediately in writing to the Architect and manufacturer's technical department. Halt Work until receipt of direction from Architect.
    14. Existing roofing materials removed during tear off to be immediately removed from the construction site to approved dumping area.
    15. Coordinate work between trades to avoid traffic over completed sections of roofing.
    16. Contact manufacturer for additional specifications if the following project conditions exist:
        1. Roof heights greater than 100 feet (30.5 m).
        2. Geographical location in a 100 mph or greater wind zone, in accordance with ANSI 100-year mean recurrence interval wind isotach.
        3. Location with Exposure D as determined by ASCE 7.
    17. Review manufacturer's written instructions, precautions, and warnings prior to using heat-welding equipment.
    18. Do not permit voids greater than 1/4 inch (6.35 mm) wide in substrate.
    19. Concrete substrates to be cured and free of laitance and curing compounds.
  1. EXAMINATION
     1. Do not begin installation until the substrates have been properly constructed and prepared.
     2. Verify deck is structurally sound, supported, and secure to provide proper securement for mechanical fasteners.
     3. Verify deck is clean and smooth, flat, free of depressions, waves or projections, properly sloped, and suitable for installation of roof system.
     4. Verify deck surfaces are dry and free of snow or ice.
     5. Verify openings, curbs, and penetrations are solidly set and cant strips, nailing strips, and reglets are properly placed.
     6. Consult manufacturer when substrate is exposed to excessively high humidity or a corrosive environment. Special stainless steel fasteners or details may be required in these environments.
     7. For Recover Work:
        1. Verify there is no coal tar pitch in existing roofing assembly. Presence of coal tar pitch requires use of a suitable slipsheet under insulation unless coal tar pitch is older than 10-years and separated from PVC membrane by layer of insulation no less than 1-1/2 inches (38.10 mm) thick and a minimum R-Value of 5.0.
        2. Joints must be butted together or completely taped to prevent volatiles from damaging the roof membrane.

\*\* NOTE TO SPECIFIER \*\*.  
Fully-Adhered:  
It is acceptable to install a Fully Adhered Mule-Hide PVC Fleece Back or PVC KEE HP Membrane Roofing System over the following decks as needed:  
1. Structural Metal Deck (22-gauge minimum) to conform to recommendations outlined in Factory Mutual's Loss Prevention Data Sheet 1-28 (requires insulation). Contact Mule-Hide's Warranty Department for attachment requirements for decks less than 22-gauge in thickness. FM testing is based on attachment to a 22-gauge steel deck.  
2. Structural concrete and pre-cast, pre-stressed concrete (2,500 psi minimum) to be cured and dry to industry standards and surface to be smooth and free of moisture or frost. Sharp ridges or other projections above the surface to be removed before roofing. An approved insulation board is recommended. Minimum deck thickness to be 2 inches with 3 inches preferred due to possible spalling damage that may occur to the underside of the deck when using fasteners for insulation and membrane attachment. Insulation may be attached with Type III or IV hot asphalt, approved adhesive or approved fasteners. The membrane may be adhered directly to structural concrete decks that have been trowel finished and are completely cured (28 day minimum). Gaps in the deck along the perimeter and around penetrations must be sealed along with vertical joints between tilt-up panels, if present, to prevent infiltration of hot humid air and possible moisture contamination resulting from condensation.  
3. Lightweight Insulating Concrete Fill and Metal Form Work (minimum 24-gauge) - the roof deck to be cured and dry to the deck manufacturer's and/or industry standards and to be smooth and free of ridges and depressions. Necessary venting as recommended by the roof deck manufacturer to be accomplished. These decks may be acceptable to receive a Fully Adhered Mule-Hide PVC Membrane Roofing System after pullout tests have been completed and appropriate fasteners have been selected. Attachment must be through the insulating concrete into the steel or concrete deck. Insulation board is required. Vapor barriers may be required when installing insulation over new decks.  
4. Wood Plank (1 inch minimum) to conform to Factory Mutual's requirements for Class 1 impregnated decks (insulation is required). FM approved wood decks are a minimum, nominal 2 inches thick, tongue and groove planks.  
5. Plywood (15/32 inch minimum) to be exterior grade (minimum CDX grade). A layer of approved insulation is required for reroof applications. On new construction, while insulation board is recommended, adhering directly to the plywood or Oriented Strand Board ("OSB") deck is acceptable if the decking is secured with screws or back-out resistant fasteners. Decks attached with common or cement coated nails or staples to be covered with an approved insulation. Check with local building code requirements as adhering an PVC membrane direct to a wood deck may not meet local fire codes.  
6. Cementitious Wood Fiber Decks - Certain cementitious wood fiber decks may be acceptable to receive a Fully Adhered Mule-Hide PVC Membrane Roofing System after pullout tests have been completed, and appropriate fasteners have been selected. This deck type requires an acceptable insulation.  
7. Gypsum Deck - To be cured and dry to manufacturers' and/or industry standards. The surface of the deck to be smooth and free from ridges and depressions. Certain gypsum concrete decks may be acceptable to receive a Fully Adhered Mule-Hide PVC Membrane Roofing System after pullout tests have been completed, and appropriate attachment methods have been selected. This deck type typically requires an acceptable insulation.  
8. Oriented Strand Board (OSB) to be a minimum 7/16 inch (11.11 mm) thick. Contact Mule-Hide for acceptable sheet sizes, fastener types and spacing when using OSB as requirements will change with thickness used. Minimum thickness or usage restrictions may change depending on local code requirements. Pullout tests must be performed and submitted to Mule-Hide Technical Department prior to bidding the project.  
Mechanically Attached:  
It is acceptable to install a Mechanically Attached Mule-Hide PVC Membrane Roofing System over the following deck substrates in new construction, provided that an acceptable insulation is installed over the substrate as needed:  
1. Structural Metal Deck (24-gauge minimum) to conform to recommendations outlined in Factory Mutual's Loss Prevention Data Sheet 1-28. Pullout tests are required on all decks less than 22-gauge. An insulation or barrier board is required to provide a smooth surface and to be of sufficient thickness to span steel flutes without damage from traffic.  
2. Plywood to conform to Factory Mutual's requirements should tested (for uplift) assemblies be required. For non-FM assemblies, plywood minimum thickness determined by local code requirements but not be less than 15/32 inch (11.91 mm) thick. Contact Mule-Hide for maximum membrane sheet widths, fastener sizes and spacing when using plywood, as requirements will change with thickness used. Insulation, barrier board or slip sheet may be required under the membrane.  
3. Structural concrete and pre-cast, pre-stressed concrete (3,000 psi minimum), cured and dry to industry standards. Surfaces to be smooth and free of moisture or frost. Remove sharp ridges or other projections above the surface before roofing. An insulation, barrier board or slip sheet is required under the membrane.  
4. Lightweight Insulating Concrete Fill and Metal Formwork (minimum 24-gauge metal formwork), Roof deck to be cured and dry to deck manufacturer's and/or industry standards and smooth and free of ridges and depressions. Comple necessary venting as recommended by the roof deck manufacturer. These decks may be acceptable to receive a Mechanically Attached Mule-Hide PVC Membrane Roofing System after pullout tests have been completed, and appropriate fasteners have been selected.  
5. Wood plank (1 inch minimum) conforming to Factory Mutual's requirements for Class I impregnated decks. An insulation, barrier board or slip sheet is required under the membrane.  
6. Cementitious Wood Fiber Decks - Certain cementitious wood fiber decks may be acceptable to receive a Mechanically Attached Mule-Hide PVC Membrane Roofing System after pullout tests have been completed, and appropriate fasteners have been selected.  
7. Gypsum Deck - Cured and dry to manufacturer's and/or industry standards. Deck to be smooth and free from ridges and depressions. Certain gypsum decks may be acceptable to receive a Mechanically Attached Mule- Hide PVC Membrane Roofing System after pullout tests have been completed and appropriate fasteners have been selected. Insulation, slop sheet or barrier board may be required over rough surfaces or plank decks.  
8. Oriented Strand Board (OSB) a minimum 7/16 inch (11.11 mm) thick. Contact Mule-Hide for acceptable sheet sizes, fastener types and spacing when using OSB as requirements will change with thickness used. Minimum thicknesses or usage restrictions may change depending on local code requirements. Pullout tests must be performed and submitted to Mule-Hide prior to bidding the project. Minimum pullout values of 250 lbs. are required. An insulation, barrier board or slip sheet is required under the membrane. Fasteners and sheet sizes determined by pullout values.  
See the manufacturer's Substrate Compatibility Table.  
For reroofing projects having plywood decks, a minimum of one layer of an approved insulation is required after the tear-off has been completed.  
Mule-Hide recommends that roof surfaces have a positive slope to provide adequate drainage. There should not be any ponding water 48 hours after rainfall.

* 1. PREPARATION OF EXISTING SUBSTRATE - GENERAL
     1. Examine substrate to ensure satisfactory conditions.
     2. Prepare surfaces using methods recommended by manufacturer's written instructions for substrate under specific project conditions.
     3. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation prior to commencement of work.
     4. Verify and confirm condition of deck or substrate and roof deck can withstand additional load.
     5. Areas with deteriorated decking, wet insulation, or other failed materials to be removed and replaced.
     6. Remove wet or damaged materials and replace with new.
     7. Clean surfaces thoroughly prior to installation.
     8. Inspect substrates and correct defects prior to application of roofing membrane.
     9. Concrete substrates to be cured, free of laitance, and free of curing compounds.
     10. Substrates and flashing substrates to receive new insulation, membrane or flashing to be thoroughly dry and free of oil, dirt, grease, sharp edges and debris.
     11. Ensure decking is securely fastened.
     12. Do not permit voids greater than 1/4 inch (6.35 mm) wide in substrate.
     13. Cut and patch large blisters to provide level substrate surface.
     14. When additional thickness of insulation is added, add new nailers to match the height of new insulation. Securely anchor nailers to roof deck in accordance with the requirements of this Specification.
     15. Roof surfaces to be free of ponded water, ice, or snow. Eliminate ponding that remains after a period of 48-hours by installing tapered insulation to create positive drainage of the roof surface or by installing new drains in low areas where ponding remains. Positive drainage to eliminate possibility of excessive live loads caused by ponding water that could cause structural damage or failure.
     16. In addition, for recover projects:
         1. Remove existing phenolic insulation and sprayed in place urethane roofs.
         2. Tear off existing base flashings, cant strips, and projection flashings down to substrate.
         3. Flashing substrate to be dry and free of oil, dirt, grease, sharp edges and debris.
         4. Verify existing nailers are in good condition and securely anchored to deck.
         5. Remove gravel over existing nailers prior to installation of new nailers, flashings and insulation.
         6. Remove lead pipe and drain flashings.
         7. Recovering over a smooth surfaced built-up roof and smooth modified bitumen roof system requires installation of acceptable insulation prior to mechanically attaching a new layer of insulation. Remove lead pipe and drain flashings.
         8. Single-ply membranes such as EPDM, Hypalon, PVC or CPA to have existing flashings removed, field sheet cut into sections no larger than 10 feet (3 m) by 10 feet (3 m), and a mechanically attached layer of insulation over existing field membrane.
         9. When removing existing roof, remove only the amount of roofing and flashing that can be made watertight with new materials by end of workday or prior to the onset of inclement weather.
         10. Polyurethane foam roofing systems (PUF) are not acceptable for recover applications. PUF system must be completely removed and new insulation installed prior to installation of the new PVC Roofing System.
     17. If Premium System Warranty is Requested:
         1. Existing roof system must be removed to the deck prior to installation of new roofing system or require completion of a moisture survey by an independent third party.
         2. Remove wet areas.
         3. Submit copy of survey to manufacturer with warranty application.
         4. Premium System Warranty does not cover existing roof systems or problems created by existing roof systems.

\*\* NOTE TO SPECIFIER \*\*.  
Specific climatic 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 (which may be required by local building or energy codes) and its type and location in the roofing system.  
A vapor retarder may often act as an "air barrier" which may have a positive effect in reducing internal air pressure. Vapor retarders should be strongly considered for buildings subject to high internal air pressures such as airplane hangars and buildings with many loading bays such as warehouse facilities.  
The National Roofing Contractors Association recommends the installation of vapor retarders when interior relative humidity is 45 percent or greater and the outside mean average January temperature is below 40 degrees F.  
In reroofing where existing built-up roof is to remain, built-up roof may be an adequate vapor retarder provided splits or tears are repaired to provide a total barrier to vapor penetration.  
Projects utilizing Mule-Hide's F5 Air & Vapor Barrier must follow Mule-Hide's installation instructions and details for the F5 Air & Vapor Barrier.

* 1. VAPOR RETARDER INSTALLATION
     1. In accordance with manufacturer's written instructions.
  2. SELF-ADHERED MEMBRANE INSTALLATION
     1. Install membrane, vapor retarder and accessories over suitable substrate with side laps, end laps, and penetrations sealed in accordance with the manufacturer's written installation instructions.
     2. Membrane may be loosely laid or adhered with the manufacturer's recommended adhesive.
     3. Unroll and allow membrane to relax a minimum of 15-minutes when temperature is above 60 Degrees F, or 30-minutes when temperature is below 60 Degrees F, prior to installation.
     4. Inspect and remove damaged membrane.
     5. Field Sheet Attachment:
        1. Membrane to run perpendicular to direction of steel deck flutes and orientation of wood decks where possible.
        2. Install membrane overlaps to facilitate flow of water.
        3. Seams: Shingled or run parallel to flow of water. Backwater seams are not permitted.

\*\* NOTE TO SPECIFIER \*\*.  
Mule-Hide Self Adhering PVC Fleece Back and PVC Kee HP membranes to have a 3 inches (76.20 mm) fleece-free selvage edge along one edge of the membrane. Lap sheets a minimum of 3 inches (76.20 mm) of fleece-free seam to provide space for a continuous, minimum 1-1/2 inches (38.10 mm) weld.  
Membrane overlaps to be shingled with the flow of water. Welded field seams to be a minimum of 2 inches (50.80 mm) wide.

* + - 1. Position membrane over substrate with 3 inch (76.20 mm) selvage edge overlap at lap seams and positioned so laps will shed water.
      2. After membrane has relaxed, fold membrane in half lengthwise exposing underside of sheet.
      3. Lap sheets a minimum of 3 inch (76.20 mm) of fleece-free seam to provide pace for a continuous, minimum 1-1/2 inches (38.10 mm) welds.
      4. Membrane Overlaps: Shingled with the flow of water.
      5. Welded Field Seams: Minimum 2 inches (50.80 mm) wide.
      6. End Laps: Butted and stripped-in with reinforced membrane.
      7. Do not run seams through field drains or sumps. Cut-out seams running through drains and install 36 x 36 inches (914.40 x 914.40 mm) target patches.
      8. Inspect welded seams for continuity and integrity using a cotter pin puller or other suitable blunt object.
    1. Adhesives:
       1. HydroBond PVC Bonding Adhesive:
          1. Once several sheets are rolled out, carefully positioned each sheet with a 3 inch (76.20 mm) side lap and with end laps butt jointed and allow membrane to relax.
          2. After sheets have relaxed, take end of first sheet and pull back to expose underside of sheet. Pull sheet back one half of its length onto itself.
          3. Mix adhesive scraping sides and bottom of can (minimum of 5-minutes) until adhesive is uniform in color. Consult manufacturer's Product Data Sheet for adhesive instructions.
          4. Apply smooth even coating of adhesive to substrate only and immediately roll fleece back membrane into wet adhesive.
          5. Apply adhesive to substrate in a uniform manner at the rate of 100 to 120 sq ft per gallon. Avoid globs, puddles and uncoated areas. Additional adhesive may be required on porous substrates.
          6. Once membrane has been mated to insulation, broom membrane with a stiff bristled push broom to ensure proper contact and 100 percent adhesion.
          7. Adhesive can be applied with a 1/4 inch (6.35 mm) or 3/8 inch (9.52 mm) nap roller.
          8. Adhesive must be wet at time of membrane placement.
          9. Repeat procedure for second half of sheet and each successive sheet of membrane on the roof and shingle laps.
          10. Do not run seams through field drains or sumps.
          11. Cut seams running through drains or sumps and install 36 x 36 inch (914.40 x 914.40 mm) target patches.
          12. Do not apply adhesive in seam lap areas to be heat welded.
       2. Helix Max Low-Rise Adhesive:
          1. Slide-in Method:

Unroll Fleece Back sheet and position. Fold sheet back in half lengthwise, end-to-end.

Spray apply, splatter apply, or bead apply adhesive to substrate.

For fully adhered application, spray adhesive to obtain full coverage, 1/8 to 1/4 inch (3.18 to 6.35 mm) thick after foaming. Ensure end laps are protected from adhesive.

For bead applications, apply at 4 inch (101.60 mm), 6 inch (152.40 mm), or 12 inch (304.80 mm) on center with a minimum of 1/2 inch (12.70 mm) wide wet bead. Ensure end laps are protected from adhesive.

Once string time occurs, gradually roll Fleece Back membrane into adhesive, checking for string/body every few feet.

If membrane reaches adhesive that has not developed string/body, stop rolling fleece back membrane into adhesive until string develops.

As sheet is being installed, immediately start rolling membrane width-wise with a 150-pound segmented weighted roller. Repeat process until Fleece Back sheet is fully installed.

* + - * 1. Roll-in (Modified Bitumen) Method:

Unroll Fleece Back sheet and position in place.

Starting at one end of membrane, using roll core, carefully roll membrane back up halfway ensuring no reposition of the membrane. Leaving half of membrane laid out will help prevent repositioning.

Spray apply, splatter apply, or bead apply adhesive to substrate.

For fully adhered application, spray adhesive to obtain full coverage, 1/8 to 1/4 inch (3.18 to 6.35 mm) thick after foaming. Ensure end laps are protected from adhesive.

For bead applications, apply at 4 inch (101.60 mm), 6 inch (152.40 mm), or 12 inch (304.80 mm) on center with a minimum 1/2 inch (12.70 mm) wide wet bead. Ensure end laps are protected from adhesive.

Once string time occurs, gradually roll Fleece Back membrane into adhesive, checking for string/body every few feet. If membrane reaches adhesive that has not developed string/body, stop rolling fleece back membrane into adhesive until string develops.

As sheet is being installed, immediately start rolling membrane width-wise with a 150-pound segmented weighted roller. Repeat process until Fleece Back sheet is fully installed.

* + 1. Test Seams:
       1. Provide sample test seams each day prior to welding field seams.
       2. Using scrap material, run at least two test seams, each a minimum of 2 feet (0.6 m) long.
       3. Use each test seam to determine adequate seam strength and to ensure equipment has warmed up, is operating properly, and proper settings have been determined.
       4. Conduct test seams each time equipment is turned on after a cool down period.
    2. Perimeter:
       1. When installing Fully Adhered PVC Self Adhering Roofing Membrane System, it is not necessary to install half sheets parallel with the perimeter. Install full size sheets to minimize number of field seams.
       2. In place of half sheets, install additional fasteners in insulation in the perimeter areas as defined in Perimeter Enhancements.
       3. Weld laps for seams and end laps continuously with a minimum weld width of 2 inches (50.80 mm).
       4. Complete field welds with an automatic welder.
       5. Determine perimeter areas using one of the following methods:
          1. Manufacturer's Technical Bulletin addressing Standard Fastening Patterns and Guidelines.

Minimum Perimeter Area: 8 feet (2.4 m) in from roof edge along exterior roof edges.

* + - * 1. For Factory Mutual insured buildings, follow guidelines in FM's Loss Prevention Data Sheet 1-29. Contact manufacturer's warranty department for fastener spacing in compliance with FM 1-60 and 1-90 requirements.
  1. MECHANICALLY ATTACHED MEMBRANE INSTALLATION
     1. Unroll Membrane and position without stretching.
     2. Allow membrane to relax a minimum of 15-minutes when temperature is above 60 Degrees F, or 30-minutes when temperature is below 60 Degrees F, prior to installation.
     3. Inspect and remove damaged membrane.
     4. Lap sheets a minimum of 5 inches (127 mm) for In-Lap Fastening, leaving space for mechanical fasteners and platers and space for a 1-1/2 inch (38.10 mm) minimum weld.
     5. Membrane Overlaps: Shingled with flow of water.
     6. In-Lap Fastening:
        1. Perimeter and Corner Areas: Install a minimum of one perimeter sheet, 1/2 width sheet, parallel with perimeter and fastened with approved fastening system at predetermined spacing in lap area in a line centered approximately 1-1/2 inches (38.10 mm) from edge of sheet leaving 2 inches (50.80 mm) of membrane outside the disc.
        2. Weld lap area continuously with a minimum weld width of 1-1/2 inches (38.10 mm).
        3. Perimeter Areas Determined by the Following Methods:
           1. 1/10th the lesser plan dimension.
           2. 4/10th the eave height.
           3. Whichever is less.
        4. Corner Areas are defined as the intersection of two perimeter areas.
        5. Perimeter Sheets:
           1. Required in perimeter and corner areas.
           2. Reduce spacing of rows of fasteners in perimeter areas to 60 percent of spacing of rows of fasteners in field sheets.
           3. Spacing of fasteners in seam to remain the same distance apart as spacing of fasteners in seams in field sheets.
           4. Reduce spacing of rows of fasteners in corners to 40 percent of spacing of rows of fasteners in field sheets.
           5. Spacing of fasteners in seams to remain the same distance apart as spacing of fasteners in seams in field sheets.
        6. Install fasteners in accordance with manufacturer's written instructions and with manufacturer's recommended fastening tools.

\*\* NOTE TO SPECIFIER \*\*.  
If project requires FM compliance, contact Mule-Hide to review sheet layouts, sizes and enhancements to address the perimeter and corner areas.

* + - 1. When installing PVC Membranes using PVC coated metal flashing or PVC membrane flashing, first perimeter sheet to be a half width sheet. Subsequent sheets may be either Perimeter sheets (half width sheets) or full width sheets as required.
      2. For FM 1-90 or greater compliance, where the perimeter sheets are wider than 3 feet (0.9 m), perimeter sheets cannot run parallel with direction of flutes on steel decks. Full width field sheets to run perpendicular to edge of roof (or base of parapet wall) and additional row of fasteners installed running parallel and centered between field seams.
    1. Field Areas:
       1. Membrane to run perpendicular to direction of steel deck flutes and orientation of wood decks.
       2. Install membrane overlaps to facilitate flow of water.
       3. Overlap membrane sheets a minimum of 5 inches (127 mm) to provide space for fastener and disc placement and for continuous 1-1/2 inch (38.10 mm) wide weld.
    2. Welded Seams:
       1. Inspect welded seams for continuity and integrity using a cotter pin puller or other suitable blunt object.
    3. Test Seams:
       1. Provide sample test seams each day prior to welding field seams.
       2. Using scrap material, run at least two test seams, each a minimum of 2 feet (0.6 m) long.
       3. Use each test seam to determine adequate seam strength and to ensure equipment has warmed up, is operating properly, and proper settings have been determined.
       4. Conduct test seams each time equipment is turned on after a cool down period.
    4. Quality Control of Seams:
       1. After seaming, check seams for integrity with a blunt-ended probe. Repair openings or fishmouths with a hand-held hot-air tool fitted with a narrow nozzle tip and with a roller.
       2. Each day, attempt to pull apart several sections of welded seams to test quality of welds.
       3. Should welds be deficient, conduct a more thorough examination of the Work and make repairs.
       4. Use cut edge sealant to seal membrane edges where reinforcing fabric is cut and exposed.
  1. WELDING OF LAP AREAS
     1. General:

\*\* NOTE TO SPECIFIER \*\*.  
Side laps have a selvage edge that allows them to be heat welded together.  
End laps must be butted together and covered with a minimum 6 inches (152.40 mm) wide strip of reinforced membrane that is heat welded along edges.  
Reference Mule-Hide Detail MHP-UN-104E.

* + - 1. Comply with manufacturer's written requirements for heat welding.
      2. Surfaces being welded to be clean and dry.
      3. PVC Self Adhering Roofing Membrane: Hot air welded only.
      4. Seaming membrane to membrane and flashing/detail membrane to membrane is only allowed by hot air welding.
      5. Apply cut edge sealant to cut edges of reinforced membrane.
    1. Hot Air Welding.
       1. Comply with hot air welding equipment manufacturer's written instructions for use.
       2. Comply with the requirements of the Authorities Having Jurisdiction regarding electric grounding, supply, and other related functions.
       3. Use a portable generator for hot air welding equipment power.
       4. Automatic welding machines for field sheet seaming is required.
       5. Hand welding is allowed for flashings and seams where the automatic welder cannot be used.
       6. Hand-held Welding Equipment for Membrane:
          1. After preheated nozzle tip is applied in overlap area and material starts to soften, immediately follow with a silicone hand roller to press heated membrane surfaces together with slow, even movements.
          2. Keep roller within 1 inch (25.40 mm) of nozzle tip.
          3. Angle hot air tool so flowing air faces roller.
          4. Test seam strength when cooled and a minimum of 8-hours after hot air welding is complete.

\*\* NOTE TO SPECIFIER \*\*.  
For T-joint Covers, see manufacturer's Detail MHP-UN-105B.  
T-Joint Covers.

* + - 1. Comply with manufacturer's written instructions.
      2. Separate T-joint patches are required over T-joints.
      3. For 50-mil Membrane and Maximum Warranty Length of 15-years:
         1. Give careful attention to T-lap seams formed where second perpendicular half-sheet overlaps butt ends of field sheets.
         2. To ensure proper seaming of the T-joints, crease top layer of Heat-Weld Membrane a minimum of 1 inch (25.40 mm) into lower layer of membrane by using heat gun with narrow or pencil tip nozzle and rubber hand roller.
         3. Inserting heat gun nozzle between layers of membrane, membrane will soften and begin to flow allowing it to crease and seal completely after applying pressure with hand roller to ensure adequate bonding of the softened material.
         4. Apply edge sealant on all cut edges of reinforced membrane.
    1. For Membrane thickness greater than 50-mil or warranty length greater than 15 years, separate T-joint patches are required over T-joints.

\*\* NOTE TO SPECIFIER \*\*.  
For Patches, see manufacturer's Detail MHP-UN-105C.

* + 1. Seam Patches at Roof/Wall Transitions.
       1. Installation of Non-Reinforced PVC Flashing Membrane patches over seams that transition from the horizontal to vertical is required.
       2. Patches constructed with Non-Reinforced PVC Flashing Membrane only.
    2. Daily Welding Equipment Setup.
       1. Provide sample test seams each day prior to welding field seams.
       2. Using scrap material, run at least two test seams, each a minimum of 2 feet (0.6 m) long.
       3. Use each test seam to determine adequate seam strength and to ensure equipment has warmed up, is operating properly, and proper settings have been determined.
       4. Conduct test seams each time equipment is turned on after a cool down period.
    3. Quality Control of Seams.
       1. After seaming, check seams with a probe for integrity.
       2. Repair openings or fishmouths with hand-held hot air tool fitted with a narrow nozzle tip and with a roller.
       3. Each day, attempt to pull apart several sections of welded seams to test quality of welds.
       4. Should welds be deficient, conduct a more thorough examination of the Work and make necessary repairs.
  1. INDUCTION WELDING
     1. General:
        1. Work to begin at highest point of roof level and proceed to lowest point.
        2. Work completed each day to include flashings, terminations, and daily seals.
        3. Prepare existing roof deck or substrate in accordance with manufacturer's written instructions.
     2. Installation: Reference manufacturer's written requirements.
     3. Induction Welding Plates:
        1. Position Induction Welding Plates over substrate with row and fastener spacing as determined by project requirements.

\*\* NOTE TO SPECIFIER \*\*.  
Consult manufacturer's Technical Department for attachment requirements.

* + - 1. Comply with manufacturer's attachment requirements.
      2. Induction Welding Plate to match type of Heat-Weld membrane being installed.
      3. Induction Welding Plates are not for use with fleece backed membranes.
    1. Membrane Installation and Hot Air Welding:
       1. Place membrane over substrate with minimum 3 inches (76.20 mm) overlap at lap seams and position so laps will shed water.
       2. Allow membrane to relax.
       3. Hot-air weld seams with automatic welder to achieve a minimum 2 inches (50.80 mm) wide heat weld.
       4. Bond Heat-Weld membrane to Induction Welding Plates with Induction Welding Tool.
       5. If expanded or extruded polystyrene insulation is top layer, install RhinoBond Cardboard Disc's between plate and insulation.
    2. Additional Membrane Securement:
       1. Secure membrane at perimeter of each individual roof area, projections, and angle changes that exceed 2 inches (50.80 mm) per lineal foot.
       2. Consult manufacturer's published detail drawings.
    3. Membrane Flashing:
       1. Remove existing base flashings or cover with suitable material.
       2. Install new membrane flashings in accordance with manufacturer's written requirements.
       3. Terminate flashings along top edge in accordance with manufacturer's published details.
  1. ADDITIONAL MEMBRANE SECUREMENT (BASE ATTACHMENT).

\*\* NOTE TO SPECIFIER \*\*.  
See Manufacturer's standard PVC details for requirements and placement.

* + 1. Provide additional securement of PVC membrane by mechanical attachment at perimeter of each roof level, base of walls, curbs, skylights, expansion joints, tie-ins, interior walls, bottom of valleys and angle changes that exceed inclines of 2:12 (2 inch rise in 12 inches) and various penetrations.
    2. Mechanical attachment of membrane may be achieved by the following methods:
       1. Seam Plate and Appropriate Fasteners:
          1. Seam Plate: 2.4 inch (60.96 mm).
          2. Required fasteners.
          3. Place Seam Plate and fasteners with edge of seam plate 1/2 inch (12.70 mm) away from angle change.
          4. Place Seam Plates horizontally or vertically dependent upon project conditions.
       2. All Purpose Bar:
          1. Extruded aluminum bar with pre-punched holes 6 inches (152.40 mm) on center.
          2. Place bar horizontally or vertically dependent upon project conditions and manufacturer's details.
          3. Maximum Spacing of Fasteners: Not-to-exceed 12 inches (304.80 mm) on center.
          4. Space adjoining bars 1/2 to 1 inch (12.70 to 25.40 mm) apart.
          5. Attach bars at ends a maximum of 1 inch (25.40 mm) from end of each bar. Pre-drilling of additional holes may be required.
          6. Deburr cut bars.
          7. Manufacturer approved PVC 0.050 Reinforced 9 inches x 100 feet to strip in All Purpose Bar with a continuous, minimum of 1-1/2 inches (40 mm) wide weld.
          8. Install All Purpose Bar a minimum of 3 inches (76.20 mm) to a maximum of 6 inches (152.40 mm) from inside and outside corners.
       3. Attachment Strip: Use manufacturer approved 6 inches (152.40 mm) wide standard reinforced membrane PVC attachment strip.
          1. Install 6 inch (152.40 mm) wide reinforced strip of PVC membrane at base of walls and curbs.
          2. Provide 2.4 inch (60.96 mm) Seam Plates to attach reinforced strip of PVC membrane horizontally with appropriate fasteners.
          3. Install 6 inch (152.40 mm) strip of reinforced PVC membrane prior to placement of field sheet.
          4. Place 6 inches (152.40 mm) strip of reinforced PVC membrane on horizontal surfaces only and not turned up vertically.
          5. Primer is not required to prepare the 6 inch (152.40 mm) wide strip.
          6. Reinforced PVC membrane strip must be clean and dry.
          7. Spacing of Fasteners: Not-to-exceed 12 inches (304.80 mm) on center. Space adjoining reinforced PVC strips a maximum of 1 inch (25.40 mm) apart. Overlap of reinforced PVC strips is not required.
          8. For horizontal attachment, place 6 inch (152.40 mm) strip of reinforced PVC membrane a maximum of 1/2 inch (12.70 mm) from base of angle change extending out onto horizontal surface (roof substrate).
          9. Place 2.4 inch (60.96 mm) Seam Plate a minimum of 1/2 inch (12.70 mm) to a maximum of 1 inch (25.40 mm) from exterior edge of strip.

Install plates a minimum of 6 inches (152.40 mm) to a maximum of 9 inches (228.60 mm) from the inside and outside corners.

* + - 1. PVC Coated Drip Edge and Gravel Stop:
         1. For drip aprons and gravel stops, metal flange to extend a minimum of 3 inches (76.20 mm) onto wood nailer.
         2. Wood nailer to be wider than metal flange.
         3. Install approved screw fasteners a maximum of 6 inches (152.40 mm) on center and 1/2 inch (12.70 mm) to 3/4 inch (19.05 mm) from inside edge of metal flange.
         4. Space ring shank nails a maximum of 4 inches (101.60 mm) on center.
  1. VAPOR RETARDER INSTALLATION
     1. Install vapor retarder over suitable substrate in accordance with manufacturer's written installation instructions and details.
     2. Install with side laps, end laps, and penetrations sealed.
  2. WOOD NAILER INSTALLATION
     1. Wood nailers are required at roof perimeter edges with metal edging and gutter systems or where shown on manufacturer's standard details.
     2. Firmly anchor nailers to decks at a maximum 2 feet (0.6 m) on center and to resist a pullout force of 200 lbs./linear foot in any direction.
     3. Provide a 1/2 inch (12.70 mm) vent space between adjacent lengths of nailers.
     4. Install fasteners within 6 inches (152.40 mm) of each end. Spacing and fastener embedment to conform to FM Loss Prevention Data Sheet 1-49.
     5. Height of Nailers: Match surface level of insulation and roof membrane.
     6. Width of Wood Nailer: Extend beyond metal flange to prevent damage to membrane.
     7. Reused woodwork to be free of rot and resist a minimum force of 200 lbs (90.7 kg)./linear foot in any direction.
     8. Wood nailers with creosote and asphaltic preservatives are not permitted.
     9. Pressure treated lumber is not required unless specified.

\*\* NOTE TO SPECIFIER \*\*.  
When a Mule-Hide Premium System Warranty is requested, only Mule-Hide labeled insulation may be used unless written approval is obtained, prior to job bid, for an alternative insulation.  
Insulation other than Mule-Hide labeled insulation must be an FM approved insulation and approved by Mule-Hide for use under Roofing System.  
Reference the insulation manufacturers guidelines for the appropriate type, size and thickness of the insulation needed for use over the respective substrate and under the Roofing System.  
Contact Mule-Hide Technical Department prior to bidding the project to determine approved insulations and assemblies.

* 1. INSULATION INSTALLATION
     1. Install in accordance with manufacturer's written instructions.
     2. Install and secure to roof deck in accordance with manufacturer's written instructions, approved submittals, and in proper relationship with adjacent construction utilizing manufacturer approved fasteners.
     3. When more than one layer of insulation is used, lay succeeding layers staggered in relation to previous layer of insulation and stagger joints. Fasten layers as a single layer with one fastener. It is not required that each layer be individually attached.
     4. Neatly cut to fit around penetrations and projections with a maximum allowable gap of 1/4 inch (6.35 mm).
     5. Repair open joints greater than 1/4 inch (6.35 mm) with like insulation material.
     6. Install tapered insulation in accordance with approved shop drawings.
     7. Feather or taper insulation to provide a minimum sump area of 36 x 36 inch (914.40 x 914.40 mm) at drains, where possible.
     8. Install crickets and saddles beneath specified insulation where possible. Crickets and saddles made from non-compatible insulations materials must be overlaid with a manufacturer approved insulation or underlayment.
     9. Do not install insulation in inclement weather.
     10. Do not install more roof insulation in one day than can be covered with Membrane or when inclement weather is expected.
     11. Inspect insulation installed over steel decks to ensure no edges are left unsupported along the flutes.
     12. Install insulation in sufficient thickness and density to prevent breakage under normal roof construction traffic.
     13. Offset end joints of each row of insulation against the previous row. When more than one layer of insulation is used, lay succeeding layers staggered in relation to previous layer of insulation and offset joints.
     14. Mechanical Attachment:
         1. Insulation fastening density will vary based on insulation type, thickness, and required warranty.
         2. Increased fastening density may be required by the Authorities Having Jurisdiction or project wind speed and wind uplift requirements. Confirm with Architect.
         3. Minimum Attachment Rates:
            1. 2-foot x 4-foot Boards: Two per board.
            2. 4-foot x 4-foot Boards: Four per board.
            3. 4-foot by 8-foot Boards: Six per board up to 2 inches (50.80 mm) thick.
            4. 4-foot x 8-foot Boards: Five per board, 5 inches (127 mm) thick or greater.
         4. Number of Fasteners per 4-foot x 8-foot Board:
            1. Polyisocyanurate, minimum 2 inch (50.80 mm) thick (top layer):

Field: 8.

Perimeter: 12.

Corner: 16.

* + - * 1. Polyisocyanurate, minimum 1-1/2 inch (38.10 mm) up to 2 inches (50.80 mm) thick:

Field: 12.

Perimeter: 18.

Corner: 24.

* + - * 1. Polyisocyanurate, minimum 1 to 1-1/2 inches (25.40 to 38.10 mm) thick:

Field: 16.

Perimeter: 24.

Corner: 32.

* + - * 1. 1/2 inch (12.70 mm) HD Poly-ISO, installed over approved insulation:

Field: 16.

Perimeter: 24.

Corner: 32.

* + - * 1. HD Fiberboard, minimum 1/2 inch (12.70 mm) thick, installed over approved insulation:

Field: 16.

Perimeter: 24.

Corner: 32.

* + - * 1. Roof Board: Minimum 1/4 inch (6.35 mm) thick, installed over approved insulation:

Field: 12.

Perimeter: 18.

Corner: 24.

* + - * 1. Oriented Strand Board: Minimum 7/16 inch (11.11 mm) thick, installed over approved insulation:

Field: 17.

Perimeter: 25.

Corner: 32.

* + - * 1. Approved Oriented Strand Board (OSB)/Polyisocyanurate Composite: Minimum 2 inch (50.80 mm) thick:

Field: 17.

Perimeter: 25.

Corner: 32.

\*\* NOTE TO SPECIFIER \*\*.  
Width of roof perimeter and corner areas is defined as the smaller of 0.1 times the building lesser plan dimension or 0.4 times the eave height (mean roof height for slopes greater than 2: 12 slope), except for heights greater than 60 feet (18.3 m). Contact manufacturer for Factory Mutual projects exceeding 60-foot heights.

* + 1. Perimeter Enhancements:
       1. To meet increased uplift requirements in the perimeters and corners of each roof area, comply with additional insulation attachment provisions as follows:
          1. Minimum width of perimeter and corner areas no less than 8 feet (2.4 m).
          2. Perimeters: Increase insulation attachment 50 percent over the field attachment requirements with a maximum of one fastener every 1-square foot.
          3. Corners: Increase insulation attachment 100 percent over field attachment requirements with a maximum of one fastener every 1-square foot.
          4. Factory Mutual Projects: Minimum width of perimeter and corner areas no less than 3 feet (0.9 m).
    2. Slipsheet:
       1. If slipsheet is required, install roof membrane immediately after slipsheet to prevent displacement.
       2. Overlap slipsheet a minimum of 4 inches (101.60 mm) on each edge.
       3. Plates and fasteners may be necessary to anchor slipsheet when installing in windy conditions.
       4. Use sufficient fasteners to ensure slipsheet lays flat under roof membrane.
    3. Adhesive Attachment:
       1. Application surface to be clean, dry, and free of fins, protrusions, sharp edges, loose and foreign materials, oil, and grease.
       2. Fill depressions greater than 1/4 inch (6.35 mm) with approved adhesive or patching material.
       3. Remove sharp projections.
       4. Prime previously unoxidized (shiny) asphalt with approved contact adhesive.
       5. Seal gaps between wall/penetration and concrete deck with air and vapor barrier, expanding foam insulation, or manufacturer approved material to avoid condensation issues and positive pressure from air infiltration.
       6. Apply adhesive when substrate and ambient temperatures are 25 Degrees F or above when spraying or extruding with heated or non-heated equipment.
       7. Dispense adhesive between 300 to 800 psi in accordance with equipment used.

\*\* NOTE TO SPECIFIER \*\*.  
CAUTION: Gaps between horizontal and vertical surfaces of the roof area as well as gaps around penetrations must be sealed to prevent interior warm air from infiltrating and condensing within the roofing assembly. Condensing moisture could weaken bottom insulation facer and eventually result in dislodgement or loose boards when adhesive is used.  
Projects utilizing Mule-Hide's F5 Air & Vapor Barrier must comply with Mule-Hide's installation requirements and published details.

* + 1. Adhesive Installation:
       1. Install in accordance with manufacturer's written instructions.
       2. Adhesive Installation to Substrate:
          1. Fully Adhered Applications: Spray adhesive to obtain full coverage, 1/8 to 1/4 inch (3.18 to 6.35 mm) thick after foaming.
          2. Bead Applications: Apply adhesive at 4 inch (101.60 mm), 6 inch (152.40 mm), or 12 inches (304.80 mm) on center with a minimum 1/2 inch (12.70 mm) wide wet bead.

For Steel Decks: Bead attachment of adhesive to run parallel with and on top of steel deck flutes.

Comply with manufacturer's bead spacing requirements.

Consult manufacturer for Factory Mutual bead spacing requirements.

* + - * 1. Allow adhesive to rise and develop string/body, 1-1/2 to 2-minutes. String time will vary based on environmental conditions.
        2. Do not allow the adhesive to over-cure and lose tack prior to setting insulation boards.
      1. Place insulation boards, maximum 4 feet (1.2 m) x 4 feet (1.2 m) into adhesive after allowing adhesive to rise and develop string/body.
      2. Designate one person to walk boards into place.
      3. Roll boards between 5-7 minutes from initial adhesive application.
      4. Boards may be temporarily weighted or relief-cut where necessary to keep boards in constant contact with adhesive until cured.
      5. At beginning of insulation attachment process and periodically throughout day, check adhesion of boards to ensure a tight bond and maximum contact is achieved.

\*\* NOTE TO SPECIFIER \*\*.  
AdhesiveSingle Sided (Wet Lay)Double Sided (Contact)TPO Bonding AdhesiveNoYesLow-VOC Bonding AdhesiveNoYesLow-VOC 1168 Bonding AdhesiveNoYesAqua Base 120 AeroWeb Low-VOC Aerosol Contact AdhesiveNoYesRefer to Product Data Sheets for specific installation instructions related to each adhesive option.Reference Product Data Sheets for specific installation instructions for each adhesive option.

* 1. FLASHING INSTALLATION
     1. PVC Coated Metal Flashings:
        1. Install PVC coated metal flashing in accordance with manufacturer's written instructions and standard details.
        2. Complete metalwork concurrently with roofing and flashings to achieve watertight condition daily.
        3. Install PVC coated metal at peaks, valleys, and slope intersections where net change in slope exceeds 1-1/2 inches (38.10 mm) in 12 inches (304.80 mm).
        4. In some cases, reinforced membrane may be sufficient for ridges but should be fastened securely at transition areas.
        5. Install PVC coated metal to provide adequate resistance to bending and to allow for normal thermal expansion and contraction.
        6. Install metal joints to be watertight and staggered over nailer joints to prevent joints in nailers and joints in metal from lining up.
        7. Extend base flashings a minimum of 8 inches (203.20 mm) up vertical surfaces.
        8. Securely fasten metal flashings and terminations in the plane of roof deck with fasteners recommended by manufacturer.
        9. Provide stainless steel, galvanized metal, or other corrosion resistant fasteners used to secure flashings to wood nailers with a head diameter of not less than 3/8 inch (9.52 mm), and with fastener penetration into wood nailer of a minimum of 3/4 inch (19.05 mm).
        10. Install PVC coated metal for scuppers and metal overflows.
        11. Fabricate PVC Coated Metal to form hemmed edges to prevent sharp metal edges from cutting membrane, except when used in conjunction with wood nailers.
     2. PVC Membrane Flashings:
        1. Install flashings concurrently with roof membrane as job progresses.
        2. Temporary flashings are not allowed without written approval from the manufacturer's warranty department.
        3. Remove and replace damaged areas or water penetration due to incomplete flashings.
        4. Install fully adhered PVC membrane flashings using manufacturer's bonding adhesive.
        5. Flashing membrane thickness to match thickness of PVC membrane.
        6. Surfaces to be compatible with flashings, clean, dry, smooth and with no excessive surface roughness.
        7. If existing asphalt surface is present, place a 1/2 inch (12.70 mm) minimum plywood, 9 ounce polyester felt, acceptable insulation board or 26-gauge minimum galvanized metal barrier over asphaltic surface.
        8. After surface preparation, apply bonding adhesive using a minimum 1/2 inch (12.70 mm) nap paint roller in accordance with manufacturer's written instructions.
        9. Apply adhesive in smooth even coats, avoiding globs, puddles, or other irregularities.
        10. Cut PVC membrane used as flashing to a workable length.
        11. Apply adhesive to area of substrate to be flashed and to the back of the PVC membrane in accordance with manufacturer's written instructions.
        12. Allow adhesive to dry to a tacky state but producing strings when touched with a dry, clean finger.
        13. Roll membrane onto coated substrate.
        14. Avoid wrinkling membrane when applying to substrate.
        15. After mating membrane to substrate, carefully roll membrane with a 2 inch (50.80 mm) wide rubber hand roller to promote maximum positive contact between membrane and substrate.
        16. Overlap adjacent flashing sheets a minimum of 2 inches (50.80 mm).
        17. Extend PVC membrane flashings a minimum of 6 inches (152.40 mm) onto field sheet.
        18. Provide a minimum 1-1/2 inches (38.10 mm) hot-air weld in front of fastener plates.
        19. Side laps to overlap a minimum of 2 inches (50.80 mm) and be welded.
        20. Do not apply PVC Bonding Adhesive to seam areas that will be hot air welded together.
        21. Extend flashings a minimum of 8 inches (203.20 mm) above roof membrane level. Alternate flashing extension must be approved by Owner, Architect, and manufacturer's warranty department in writing.
        22. Hot air weld flashings at connections with roofing membrane and other PVC flashings.
        23. Apply PVC cut-edge sealant at welded edges where membrane has been cut and scrim is exposed.
        24. Terminate flashings in compliance with manufacturer's published standard details.
        25. Recover Projects:
            1. Tear off existing base flashings, cant strips and projection flashings down to substrate.
            2. Repair uncovered deteriorated areas of substrate to provide a suitable substrate for new PVC flashings.
     3. PVC Low-VOC Bonding Adhesive:
        1. Install in accordance with manufacturer's written instructions.
        2. Mix adhesive scraping sides and bottom of can for a minimum of 5 minutes until adhesive is uniform in color. Consult product data sheet for manufacturer's adhesive instructions.
        3. PVC Low-VOC Bonding Adhesive initially requires electric drill mechanical stirring.
        4. Porous surfaces and substrates may require application of a prime coat and second coat of PVC Low-VOC Bonding Adhesive to obtain proper adhesion.
        5. Using a plastic core, medium nap roller, apply a smooth even coat of PVC Low-VOC Bonding Adhesive to back side of membrane and substrate with no globs or puddles. Do not apply adhesive in area of seam laps.
        6. Coverage Rate:
           1. Membrane or Substrate: 120 sq ft per gallon for one surface.
           2. Finished Surface - Membrane and Substrate: 60 sq ft per gallon.
        7. Allow adhesive to dry to tacky state.
        8. Adhesive is ready to mate when it is tacky but does not string.
        9. Ensure proper drying.
        10. Avoid thin layers of adhesive which can result in over drying and improper adhesion.
        11. Roll coated membrane onto substrate being careful not to wrinkle sheet or trap air bubbles.
        12. Once membrane is mated to substrate, carefully roll membrane with a 2 inch (50.80 mm) wide rubber hand roller to promote maximum positive contact between membrane and substrate.
        13. Extend PVC Membrane Flashings a minimum of 6 inches (152.40 mm) onto field sheet and adhere securely.
        14. Provide a minimum of 2 inches (50.80 mm) between front of fastener plates and edge of sheet to allow for heat welding. Side laps to overlap a minimum of 2 inches (50.80 mm).
        15. Do not apply PVC Bonding Adhesive to areas of flashings and membrane to be welded.
        16. Expect extended drying times during cool, overcast, humid, shaded, or late day applications.
        17. Adhesive must be dry but still tacky prior to mating surfaces to avoid permanent blisters due to trapped solvents.
        18. Extend flashings a minimum of 8 inches (203.20 mm) above roof membrane level and terminate unless alternate installation is approved in writing by Owner and manufacturer's technical department.
        19. Hot air weld flashings at connections with roofing membrane.
        20. Apply Cut Edge Sealant at all welded edges of cut membrane flashings. Refer to manufacturer's Standard Details for more information.
        21. After flashing is adhered in place, promote full contact adhesion by going over entire area with a 2 inch (50.80 mm) rubber hand roller.

\*\* NOTE TO SPECIFIER \*\*.  
Do not use HydroBond Water-Based PVC Bonding Adhesive with Standard PVC KEE HP Membranes.

* + 1. HydroBond Water-Based PVC Bonding Adhesive:
       1. Provide clean, dry, and smooth surface free of fins, sharp edges, loose and foreign materials, oil and grease.
       2. Feather depressions greater than 1/4 inch (6 mm) using epoxy, mortar or other approved patching material.
       3. Remove sharp projections by sweeping, blowing or vacuum cleaning.
       4. First, apply a medium to heavy coat of adhesive to wall.
       5. Second, apply a standard coat to membrane flashing.
       6. Allow adhesive to dry thoroughly.
          1. Lack of thorough drying will result in poor adhesive strength and/or blistering over time.
       7. Do not apply HydroBond Water-Based PVC Bonding Adhesive to areas of flashings and membrane to be welded.
       8. Coverage Rate:
          1. Membrane and Substrate: 120 sq ft per gallon for one surface.
          2. Finished Surface - Membrane and Substrate: 60 sq ft per gallon per finished surface.
       9. Avoiding wrinkles, mate flashing membrane to adhesive coated wall.
       10. Immediately broom bonded flashing with a stiff bristle push broom, starting at angle change and rolling membrane flashing up wall.
       11. Using a 3 inch (76.20 mm) wide J-roller, roll membrane flashing into place to assure maximum contact. Work up evenly from base and in small sections ensuring full attachment at lower sections before moving to top of membrane.
       12. Temporarily tape or pin top edge of flashing to wall to prevent membrane curl-back until termination detail is completed.
       13. Expect extended drying times during cool, overcast, humid, shaded, or late day applications.
       14. Adhesive must be dry but still tacky before mating surfaces to avoid permanent blisters due to trapped moisture.
       15. Overlap adjacent flashing sheets a minimum of 2 inches (50.80 mm).
       16. Extend PVC Membrane Flashings a minimum of 6 inches (152.40 mm) onto field sheet and adhere securely.
       17. Provide a minimum of 2 inches (50.80 mm) between front of fastener plates and edge of sheet to allow for heat welding.
       18. Side laps to overlap a minimum of 2 inches (50.80 mm).
       19. Extend flashings a minimum of 8 inches (203.20 mm) above roof membrane level unless previously approved in writing by Owner and manufacturer's technical department.
       20. Hot air weld flashings at connections with roofing membrane.
       21. Hand Welds: Minimum 1-1/2 inch (38.10 mm) wide.
       22. Welds to be a minimum of 2 inches (50.80 mm) wide.
       23. Apply Cut Edge Sealant at welded edges of cut membrane flashings. Reference manufacturer's Standard Details for more information.
       24. After flashing is adhered in place, promote full contact adhesion by going over entire area with 2 inch (50.80 mm) rubber hand roller.
       25. Properly terminate flashings in accordance with manufacturer's published Standard Details.
  1. DRAINS, EXPANSION JOINTS, PITCH PANS
     1. Roof Drains:
        1. Remove existing roofing materials and metal flashings.
        2. Prepare surface around each drain to prevent distortion, tenting, or bridging of membrane. Provide smooth transition from the roof surface to the surface of the drain bowl/clamping ring.
        3. Do not run field seams through drains or sumps. If sheet layout causes seam to fall in line with drain, install target patch, minimum 36 x 36 inch (914.40 x 914.40 mm).
        4. Install manufacturer approved target patch of standard PVC or PVC KEE HP membrane at drain.
        5. If PVC Fleece Back or PVC KEE HP Fleece Back membrane is extended into roof drain, remove fleece backing from portion of membrane that extends into roof drain. See manufacturers detail drawings.
        6. Apply one full tube of water cut-off mastic to each drain. Apply to drain bowl, under membrane, where clamping ring will be seated to provide a continuous seal between membrane and drain bowl.
        7. Membrane terminating into drain to have fleece backing removed where contact is made with the Water Cut-Off mastic.
           1. Heat fleece and scrape off the back of membrane.
           2. Removal of fleece allows Water Cut-Off to bond directly to membrane creating a complete seal.
     2. Expansion Joints:
        1. Reference manufacturer's standard details and written instructions for installation requirements.
     3. Pitch Pans:
        1. Install and flash pitch pans as required by manufacturer's written instructions and standard details.
        2. Fill pitch pans with Thermoplastic One-Part Pourable Sealer.
  2. WALKWAYS
     1. Provide walkways in areas where routine rooftop maintenance and regular rooftop traffic is expected.
     2. PVC Walkway Installation:
        1. Install walkways over clean, dry surfaces.
        2. Layout areas PVC walkway rolls will be installed with material oriented to be placed between field seams with each adjacent and abutting section gapped a minimum of 6 inches (152.40 mm).
        3. Do not install walkway pads over seams or flashings.
        4. Heat weld perimeter of the properly positioned PVC Walkway Roll.
        5. Check seams for voids or inconsistencies that might prevent watertightness.
     3. Apply PVC cut-edge sealant at welded edges.
  3. PRECAST PAVERS
     1. Install manufacturer's approved precast paver systems over one layer of 6-ounce HP protection mat or other manufacturer approved slip sheet material.
     2. Sheet of PVC membrane may be used as a protection layer under precast pavers.
     3. Do not set pavers over field seams.
  4. TEMPORARY TIE-INS
     1. Install temporary cutoffs around incomplete edges of roofing assembly at end of each workday and when work is postponed due to inclement weather.
     2. Position temporary tie-ins so sealed membrane edge will not buck or pond water.
     3. Do not restrict drainage.
     4. Remove gravel, dirt, debris, or other contaminants from tie-in area and ensure surfaces are clean and dry.
     5. Seal loose membrane edges downslope with products compatible with substrate and membrane type.
     6. Provide continuous pressure along sealed edge to prevent water migration under finished roof sections.
     7. When work resumes, remove temporary seals. contaminated membrane, sealants, and insulation fillers from work area and dispose in accordance with project waste management requirements.
  5. FIELD QUALITY CONTROL
     1. Field Inspection: Coordinate field inspection in accordance with manufacturer's written requirements and Division 01, General Requirements.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with Division 01, General Requirements.
    2. At completion of installation and if a system warranty is specified, require manufacturer's authorized representative to perform on-site inspection of roof to verify material and installation requirements are met.
  1. CLEANING AND PROTECTION
     1. Clean in accordance with the manufacturers written recommendations.
     2. Clean both interior and exterior building areas affected by construction. Repair damaged areas to Owner's satisfaction.
     3. Touch-up, repair or replace damaged products before Substantial Completion.
     4. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

END OF SECTION