

# Technical Guide

"The name trusted in roofing since 1906"



## INSULATION GUIDELINES FOR SINGLE PLY SYSTEMS

### 1.0 Insulation Guidelines

- A. The following is a list of generic insulations acceptable for use with Mule-Hide Single Ply Roofing Systems. Requests to use other types of insulation boards are to be made to Mule-Hide's Technical Department in writing prior to job bid. Such requests must include the conditions for approval, project name and location of project.
- B. Insulation must be no less than 1 inch thick with the exception of high-density wood fiberboard, high density polyisocyanurate, Dens Deck Prime, Securock, extruded polystyrene and tapered boards. When the insulation is applied directly over a steel deck, in no case shall the minimum allowable thickness be less than that required to span the flutes of a steel deck.
- C. Applicable building codes should always be checked prior to proposing the application to Mule-Hide or the building owner.
- D. Factory Mutual (FM) and Underwriters Laboratory (UL) assemblies can be found in the Factory Mutual Approval Guide and/or Underwriters Laboratories Building Material Directory and Fire Resistance Directory. Code requirements may dictate the use of specific types and thicknesses of insulation. You can contact the Mule-Hide Technical Department for help in determining which Mule-Hide system may meet your code requirements.

### 2.0 Insulation

Insulation Type	Used as Overlay Board	Roof Systems		
		Adhered	Ballasted	Mech Attached
Polyisocyanurate - Min 1" thick (top layer) - Min 20 psi	Yes	Yes	Yes	Yes
OSB/Polyisocyanurate Composite - Min 1.5"	Yes	Yes	Yes	Yes
HD Polyisocyanurate Coverboard – Min ½" thick	Yes	Yes	Yes	Yes
HD Fiberboard - Min 1/2" thick <sup>8</sup>	Yes	Yes	Yes	Yes
Dens Deck Prime / Securock - Min 1/4" thick	Yes	Yes	Yes	Yes
OSB - Min 7/16" thick <sup>2</sup>	Yes	Yes	Yes	Yes
Expanded Polystyrene - Min 1" - Type I <sup>3 4 6</sup>	NO	NO <sup>1</sup>	Yes	NO <sup>1</sup>
Expanded Polystyrene w/facer - Min 1" - Type II <sup>3 4 7</sup>	NO	NO <sup>1</sup>	Yes	Yes <sup>5</sup>
Extruded Polystyrene - Min 3/4" thick - Type X <sup>3 4</sup>	NO	NO <sup>1</sup>	Yes	NO <sup>1</sup>
Extruded Polystyrene - Min 1" - Type IV <sup>3 4</sup>	NO	NO <sup>1</sup>	Yes	Yes <sup>5</sup>
Extruded Polystyrene Fan Fold – Min ¼" thick <sup>3 4</sup>	NO	NO <sup>1</sup>	NO	Yes
Protection Mat - Min 6 oz.	NO	NO <sup>1</sup>	Yes	Yes

- Notes:
- 1 - Requires overlay board
  - 2 - OSB must be installed with the rough side up
  - 3 - Not approved over Coal Tar Pitch
  - 4 - Can not be placed in contact with PVC, requires a separation layer
  - 5 - Overlay board recommended
  - 6 - Type I = min 0.90 lb density
  - 7 - Type II = min 1.35 lb density
  - 8 - DO NOT use '6-sided' or asphalt coated board for PVC or water based adhesive

See other requirements listed below.

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### 3.0 Minimum Insulation Specifications

- A. Project or Code requirements may dictate use of materials other than those listed below. Contact Mule-Hide Technical Department with questions regarding use insulations in a Mule-Hide Roofing System.
1. Wood fiberboard (High Density)  
Thickness: 1/2" Minimum  
Classification: ASTM C-208, Type 2
  2. Polyisocyanurate  
Thickness: 1" Minimum  
Classification: ASTM C 1289,  
Facers: Fiber reinforced facers, both sides
  3. High Density Polyisocyanurate  
Thickness: 1/2" Minimum  
Compressive Strength: Min 90 psi at 10% deformation  
Facers: Fiber reinforced facers, both sides
  4. Extruded Polystyrene Boards (flat stock)  
Thickness: 3/4" Minimum  
Classification: Type X  
Compressive Strength: Min 15 psi at 10% deformation  
Not for use over Coal Tar Pitch. Applications may require use of higher density material or overlay.
  5. Extruded Polystyrene Boards (fan fold)  
Thickness: 1/4" Minimum  
Compressive Strength: Min 15 psi at 10% deformation  
Not for use over Coal Tar Pitch.
  6. Expanded Polystyrene Boards  
Thickness: 1" Minimum  
Classification: Type 1  
Compressive Strength: Min 10 psi at 10% deformation  
Not for use over Coal Tar Pitch. Applications may require use of higher density material or overlay.
  7. Expanded Polystyrene Boards (fan fold)  
Thickness: 1/2" Minimum  
Classification: Type 1  
Compressive Strength: Min 10 psi at 10% deformation  
Not for use over Coal Tar Pitch. Applications may require use of higher density material or overlay.
  8. Perlite is a mineral fiber insulation board that Mule-Hide does not recommend be used in conjunction with the Mule-Hide Roofing Systems. However, should perlite be required to meet building codes, FM, or UL requirements, the perlite **must** be overlaid with an acceptable insulation. **Perlite is not acceptable for use in recover applications.**
  9. Fiberglass is not an acceptable insulation for use in Mule-Hide Roofing Systems.

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### 4.0 Insulation Fastening Patterns

- A. Insulation that is mechanically attached to the substrate shall use approved Mule-Hide fasteners. Minimum insulation attachment rates shall be as per Mule-Hide's requirements or insulation manufacturer's specifications, whichever is greater. Projects requiring Factory Mutual or other Code approvals may require heavier gauge fasteners or additional fasteners. In no case shall the insulation attachment rate be less than Mule-Hide's requirements.
- B. Insulation is always fastened with 3" Galvalume Stress Plates with minimum #12 Drill Point fasteners.
- C. Refer to Mule-Hide specifications and details for minimum fastening rates and patterns.

### 5.0 Other Methods of Insulation Attachment

- A. Mule-Hide Helix® Max Low-Rise Adhesives are an acceptable method of attaching certain insulations to specific substrates. The current Helix® Max Low-Rise Adhesive family consists of the following products:

1. Helix® Max Low-Rise Adhesive
2. Helix® Max Low-Rise Adhesive – 5-Gallon Jug
3. Helix® Max Low-Rise Adhesive – Dual Tank
4. Helix® Max Low-Rise Adhesive – Dual Cartridge

Consult the appropriate Product Data Sheet for substrate compatibility and application rates and methods.

- B. Asphalt - While Mule-Hide *may* accept (with prior notification on a job to job basis) attachment of insulation with hot asphalt for use with Mule-Hide systems, asphalt is neither supplied nor manufactured by Mule-Hide; therefore, the attachment of the insulation with asphalt shall not be covered by Mule-Hide's Standard Warranty. However, if a qualified project designer specifies asphalt attachment, the following recommendations are given:

1. Steep asphalt ASTM D312, Type III or IV, shall be specified
2. Asphalt may only be used to attach approved insulations to primed structural concrete decks, properly nailed base sheets or a base layer of mechanically attached, approved insulation. Insulation must be approved by Manufacturer for use with hot asphalt.
3. Maximum insulation board size shall not exceed 4'x 4'. **4'x 8' boards are not permitted.**
4. Expanded or extruded polystyrene insulation shall not be attached with asphalt.

- B. Mule-Hide Premium warranties require the use of Mule-Hide Helix® Max Low-Rise Adhesives. The use of other foam adhesives is prohibited without obtaining written approval from the Mule-Hide Technical Services Department prior to bidding the project.

### 6.0 Insulation Storage

- A. Insulation boards stored or stocked on the job site or roof must be stacked on pallets (or other supports) above the deck or ground.
- B. Insulation shall be covered with waterproof tarps to protect insulation from sun and inclement weather. Wet or damaged insulation must not be used in Mule-Hide roofing systems.

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- C. Insulation should not be stored on the job site for more than thirty (30) days if at all possible.

### 7.0 Insulation Application - Recommended Practices

- A. For mechanically attached systems, install field sheets perpendicular to long dimension of the top layer of insulation. Where possible, boards should run parallel to the direction of the flutes of the deck.
- B. Install insulation boards in parallel courses with tightly fitted and staggered joints. Cut all boards accurately to fit neatly around all projections and at all edges. Gaps greater than 1/4" shall be filled. End joints should be staggered a minimum of 6 inches or as approved by insulation manufacturer.
- C. Do not use wet or damaged insulation boards. Install no more insulation than can be covered with seamed membrane and watertight details before any precipitation occurs.
- D. On steel decks, the edges of insulation boards shall rest on the top of the flutes and not in suspension over the valleys.
- E. When two layers of insulation are used, the second layer must have the joints staggered to the first layer a minimum of 6 inches or as approved by insulation manufacturer. One set of fasteners may be used to secure both layers of insulation unless otherwise required by the insulation board manufacturer or the design professional.
- F. In accordance with Mule-Hide specifications, provide proper water cutoffs to completely seal the insulation on a daily basis.

**Caution:** Do not install over wet, damp or uneven substrates.

**Caution:** Keep all insulations away from fire, flame and ignition sources during storage and installation.

**End Of Section**