SECTION 6

MULE-HIDE PRODUCTS CO., INC.

20 Year Warranty
Specification Enhancements

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PLEASE CONSULT THE MULE-HIDE WEBSITE FOR THE MOST CURRENT INFORMATION

MULE-HIDE PRODUCTS CO., INC
20-Year Warranty Design Enhancements
For Ballasted TPO
Roofing System Specification

TPO Systems

All products specified for this roofing system must be manufactured or approved by Mule-Hide Products Co. This criteria is limited to buildings of 75' in height or less, located in urban or suburban exposure areas. Not applicable for coastal or high wind areas.

Membrane / Adhesive Type / Other

1. 0.060" or 0.080" thick Mule-Hide TPO Reinforced Membranes.
2. All 'T' joints overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
3. Field/Wall seam transitions must be overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
4. All field seams must be heat welded.

Deck Type

1. Any roof deck capable of supporting the weight of a Ballasted System may be used.
2. The determination that the roof deck can support the required additional loads shall be the responsibility of the building owner/owner's representative.

Slope Requirement/Drainage

1. Positive drainage required (no ponding 48 hours after a rain)
2. 1/4" per horizontal foot preferred
3. 1/8" slope with sufficient number of drains and crickets/saddles may be considered
4. Maximum roof slope of 2:12

Construction Type

1. New Construction
2. Reroof - with full tear-off
3. Recover - all wet materials removed and verification by a Independent 3rd party moisture scan

Insulation/Overlayment*

Insulation Type or Overlay
Mule-Hide Polyisocyanurate - Min 1" thick - Min 18 psi
Structodek HD Fiberboard with Primed Red Coating - Min 1/2" thick
InsulFoam Expanded Polystyrene - Min 1" - Min 1 lbs density

***NOTES:**

1. Thicknesses stated are for single layer of material.
2. Consult Specification Manual for list of approved insulations for use under overlayment.
3. Insulation must be loose-laid over an approved substrate.
4. Mechanical attachment of insulation is not permitted.
5. An approved insulation adhesive may be used with prior approval.

Ballast Requirements

Building Height	Ballast Requirements
Up to 25'	#2 Stone @ 13#/SF for 10' wide perimeter #4 Stone @ 10#/SF for field of roof
26' to 50'	#2 Stone @ 13#/SF for 20' corners #2 Stone @ 13#/SF for 10' wide perimeter #4 Stone @ 10#/SF for field of roof
Over 50'	Mule-Hide recommends the use of a interlocking ballast paver system

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Concrete Pavers

1. Minimum Size: 2' x 2' x 2"
2. Minimum Weight: 22 pounds per square foot
3. Membrane Protection: Rubber or plastic pedestals, or 4" x 4" sections of Mule-Hide Walkway Pads.
4. Paver type must be submitted to Mule-Hide for approval prior to bid.

Metal Accessories

1. All Metal copings, gravel stops, fascia, and drip aprons must be Mule-Hide Metal Accessories or pre-manufactured as per approved details.
2. Mule-Hide All Purpose Bar is required when a compression bar termination is specified and must be utilized in conjunction with counterflashing.
3. Mule-Hide Metal Accessories or the Metal-Era Anchor-Tite System must be used when the sheet metal is to be included under the warranty.
4. All metal scuppers must have welded (soldered) seams.

Other Requirements

1. No 'As-Built' projects. All projects are to be reviewed and approved prior to installation.
2. Shop drawings must include all pertinent details.
3. Contact Mule-Hide Technical Department for specific code requirements such as Factory Mutual (FM) or Underwriters Laboratory (UL).
4. Rubber walkway pads can not be used within 10' of the roof perimeter for buildings exceeding 50' in height.

Warranty Wind Speed (Maximum Peak Gusts)

Wind speed coverage for a specific project will vary depending on a variety of factors, including the deck type, location, height of the roof, and edge details.

Contact Mule-Hide Technical Department for specific requirements.

NOTES:

1. **These are enhancements to the Mule-Hide TPO Ballasted System Specification, as written in the Mule-Hide TPO Specification Manual. Refer to the Mule-Hide TPO Specification Manual for complete specification and details.**
2. **The information contained in this document is general information. Requirements may be different for each specific job based on the conditions of each building. Always contact Mule-Hide Technical Department to review the specific job conditions prior to bidding.**

MULE-HIDE PRODUCTS CO., INC
20-Year Warranty Design Enhancements
For Fully Adhered TPO
Roofing System Specification

TPO Systems

All products specified for this roofing system must be manufactured or approved by Mule-Hide Products Co. This criteria is limited to buildings of 100' in height or less, located in urban or suburban exposure areas. Not applicable for coastal or high wind areas.

Membrane / Adhesive Type / Other

1. 0.060" or 0.080" thick Mule-Hide TPO Reinforced Membranes.
2. Mule-Hide TPO Bonding Adhesive (solvent based), Mule-Hide Low Voc Bonding Adhesive, Mule-Hide Low VOC Bonding Adhesive – 1168, or WBBA 2000
3. All 'T' joints overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
4. Field/Wall seam transitions must be overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
5. All field seams must be heat welded.

Deck Type / Typical Fastener - Refer to Specifications for minimum pullout criteria.

Standard Roof Deck (4)	**Insulation Fastener** (1)	**Insulation Plate** (5)
Steel (22 gauge or heavier)	Mule-Hide DP #12	Mule-Hide 3" Metal Stress Plates
Structural Concrete (3,000 psi)	Mule-Hide HD-14 (2)	Mule-Hide 3" Metal Stress Plates
Plywood (Min 15/32" thick)	Mule-Hide DP #12	Mule-Hide 3" Metal Stress Plates
Wood Plank (Min 1-1/2" thick)	Mule-Hide DP #12	Mule-Hide 3" Metal Stress Plates
Fibrous Cement & Gypsum (2)(3)	TL Fasteners by Tru-Fast	3" TL Galvalume Insulation Plate by Tru-Fast

NOTES:

1. Heavier gauge fasteners may be required to meet Factory Mutual or code requirements.
2. Other fasteners may be considered, submit request to Mule-Hide prior to bidding.
3. Pullout testing is required, must exceed 360 pounds with TL Fastener.
4. Contact Mule-Hide Technical Department for other roof decks or non-standard roof decks.
5. 2.4" Seam Plates are NOT approved for use to fasten insulation.

Slope Requirement/Drainage

1. Positive drainage required (no ponding 48 hours after a rain)
2. 1/4" per horizontal foot preferred
3. 1/8" slope with sufficient number of drains and crickets/saddles may be considered

Construction Type

1. New Construction
2. Reroof - with full tear-off
3. Recover - all wet materials removed and verification by a Independent 3rd party moisture scan

Insulation/Overlayment - Mechanical Attachment*

	Fasteners per 4' x 8' board		
Insulation Type or Overlay	**Field**	**Perimeter**	**Corner**
Mule-Hide Polyisocyanurate - Min 2" thick (top layer) - Min 20 psi	8	12	16
Mule-Hide Polyisocyanurate - Min 1.5" up to 2" thick - Min 20 psi	12	18	24
StructoDek HD Fiberboard with Primed Red Coating - Min 1/2" thick- Installed as an overlay or recover board	16	24	32
Dens Deck Prime or Securock - Min 1/4" - Installed as an overlay or recover board	12	18	24
OSB - Min 7/16" thick - Installed as an overlay	17	25	32

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For Fully Adhered TPO

***NOTES:**

1. InsulFoam and InsulFoam R-Tech insulation is approved for warranty but it must be installed with an approved overlay board.
2. Thicknesses stated are for single layer of material.
3. Consult Specification Manual for list of approved insulations for use under overlayment.
4. Polyisocyanurate less than 1.5" and InsulFoam expanded polystyrene must have approved overlayment.
5. Premium Warranty requires the use of Mule-Hide Polyisocyanurate insulation.
6. Insulation fastening density shall not be less than 1 per 2 square feet on fibrous cement and gypsum decks.
   Certain codes may require additional fastening requirements.
7. Mule-Hide defines perimeter areas as a minimum of 8 feet. Corners areas are the intersections of the perimeter areas.
8. Factory Mutual defines perimeter areas as the lesser of 0.1 times the building width or 0.4 times the building height. Corners areas are the intersections of the perimeter areas.

Insulation/Overlayment - Adhesive Attachment

1. Insta-Stik by Dow Chemical Company or Weather-Tite One-Step by Millenium - Warranty Application must include a copy of the manufacturer's letter of acceptance for the project, including application rates for that specific project. Other Manufactures may be considered, submit prior to bidding.

Metal Accessories

1. All Metal copings, gravel stops, fascia, and drip aprons must be Mule-Hide Metal Accessories or pre-manufactured as per approved details.
2. Mule-Hide All Purpose Bar is required when a compression bar termination is specified and must be utilized in conjunction with counterflashing.
3. Mule-Hide Metal Accessories or the Metal-Era Anchor-Tite System must be used when the sheet metal is to be included under the warranty.
4. All metal scuppers must have welded (soldered) seams.

Other Requirements

1. No 'As-Built' projects. All projects are to be reviewed and approved prior to installation.
2. Shop drawings must include all pertinent details.
3. Contact Mule-Hide Technical Department for specific code requirements such as Factory Mutual (FM) or Underwriters Laboratory (UL).

Warranty Wind Speed (Maximum Peak Gusts)

Wind speed coverage for a specific project will vary depending on a variety of factors, including the deck type, fastening density, location, height of the roof, and edge details.

Contact Mule-Hide Technical Department for specific requirements.

NOTES:

1. **These are enhancements to the Mule-Hide TPO Fully Adhered System Specification, as written in the Mule-Hide TPO Specification Manual. Refer to the Mule-Hide TPO Specification Manual for complete specification and details.**
2. **The information contained in this document is general information. Requirements may be different for each specific job based on the conditions of each building. Always contact Mule-Hide Technical Department to review the specific job conditions prior to bidding.**

MULE-HIDE PRODUCTS CO., INC
20-Year Warranty Design Enhancements
For Mechanically Attached TPO
Roofing System Specification

TPO Systems

All products specified for this roofing system must be manufactured or approved by Mule-Hide Products Co. This criteria is limited to buildings of 50' in height or less, located in urban or suburban exposure areas. Not applicable for coastal or high wind areas.

Membrane / Adhesive Type / Other

1. 0.060" or 0.080" thick Mule-Hide TPO Reinforced Membranes.
2. All 'T' joints overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
3. Field/Wall seam transitions must be overlaid with TPO Non-Reinforced Flashing Membrane with heat welded seams.
4. All field seams must be heat welded.

Deck Type / Typical Fastener - Refer to Specifications for minimum pullout criteria.

Standard Roof Deck	**Max Sheet Width**	**Max Fastener Spacing**	**Fastener** (1)	**Seam Plate** (1)(5)
Steel - Min 22 ga.	12' 10' 8'	6" OC 12" OC 12" OC	HD-14 HD-14 HD-14	2.4" 2.4" 2.4"
Wood Plank - Min 2x or Plywood - Min 23/32"	12' 10' 8'	6" OC 12" OC 12" OC	HD-14 HD-14 HD-14	2.4" 2.4" 2.4"
Plywood - Min 15/32"	8'	6" OC	HD-14	2.4"
OSB – Min 15/32" (3)	8'	6" OC	HD-14	2.4"
Structural Concrete - Min 3,000 psi	12' 10' 8'	6" OC 12" OC 12" OC	HD-14 HD-14 HD-14	2.4" 2.4" 2.4"

Notes:

1. Heavier gauge fasteners may be required to meet Factory Mutual or code requirements.
2. Other fasteners may be considered, submit request to Mule-Hide prior to bidding.
3. Mechanically attached systems are not allowed over Oriented Strand Board (OSB) decks without prior approval by the Mule-Hide Technical Department. Mule-Hide will not issue system warranties on "As-Built" projects where Mule-Hide did not grant approval prior to the start of the work.
4. Contact Mule-Hide Technical Department for other roof decks or non-standard roof decks.
5. 3" Insulation Plates are NOT approved for use to fasten membrane.

Slope Requirement/Drainage

1. Positive drainage required (no ponding 48 hours after a rain)
2. 1/4" per horizontal foot preferred
3. 1/8" slope with sufficient number of drains and crickets/saddles may be considered

Construction Type

1. New Construction
2. Reroof - with full tear-off
3. Recover - all wet materials removed and verification by a Independent 3rd party moisture scan

MULE-HIDE PRODUCTS CO., INC
20 - Year Warranty Design Enhancements
For Mechanically Attached TPO
Roofing System Specification

Insulation/Overlayment - Mechanical Attachment*

Insulation Type or Overlay	Board Size	
	4' x 4'	4' x 8'
Mule-Hide Polyisocyanurate - Min 2" thick (top layer) - Min 20 psi	4	5
Mule-Hide Polyisocyanurate - Min 1.0" thick (top layer) - Min 20 psi	4	6
InsulFoam R-Tech Expanded Polystyrene 4'x8' – Min 1.25 lb density, 1" thick	4	6
Insulfoam R-Tech Fan-Fold Expanded Polystyrene – Min 1.25 lb density, 1" thick	See Notes	See Notes
StructoDek HD Fiberboard with Primed Red Coating - Min 1/2" thick	4	6
Dens Deck / Dens Deck Prime / Securock - Min 1/4"	4	6

***NOTES:**

1. Gypsum board or suitable base sheet may be approved as needed to meet required fire code.
2. Consult Specification Manual for list of approved insulations for use under overlayment.
3. Warranty requires the use of Mule-Hide Polyisocyanurate insulation.
4. Refer to Technical Bulletin #1302 Use of InsulFoam Insulation for fan fold minimum fastening requirements.
5. Contact Mule-Hide Technical Department for Polyisocyanurate less than 1.5" in thickness.
6. Certain codes may require additional fastening requirements.

Insulation/Overlayment - Adhesive Attachment

1. Insta-Stik by Dow Chemical Company or Weather-Tite One Step by Millenium - Other Manufactures may be considered, submit prior to bidding.

Metal Accessories

1. All Metal copings, gravel stops, fascia, and drip aprons must be Mule-Hide Metal Accessories or pre-manufactured as per approved details.
2. Mule-Hide All Purpose Bar is required when a compression bar termination is specified and must be utilized in conjunction with counterflashing.
3. Mule-Hide Metal Accessories or the Metal-Era Anchor-Tite System must be used when the sheet metal is to be included under the warranty.
4. All metal scuppers must have welded (soldered) seams.

Other Requirements

1. No 'As-Built'. All projects are to be reviewed and approved prior to installation.
2. Shop drawings must include all pertinent details.
3. Contact Mule-Hide Technical Department for specific code requirements such as Factory Mutual (FM) or Underwriters Laboratory (UL).

Warranty Wind Speed (Maximum Peak Gusts)

Wind speed coverage for a specific project will vary depending on the deck type, fastening density, location and height of the roof. Certain codes may require additional fastening requirements.

Contact Mule-Hide Technical Department for specific requirements such as sheet width and fastener spacing.

NOTES:

1. **These are enhancements to the Mule-Hide TPO Mechanically Attached System Specification, as written in the Mule-Hide TPO Specification Manual. Refer to the Mule-Hide TPO Specification Manual for complete specification and details.**

2. **The information contained in this document is general information. Requirements may be different for each specific job based on the conditions of each building. Always contact Mule-Hide Technical Department to review the specific job conditions prior to bidding the project.**