



# MULE-HIDE PRODUCTS CO., INC FASTENER GUIDELINES

## Fastener Overview

- A. Mule-Hide offers a variety of fasteners and plates to:
- Attach roof insulation
  - Attach mechanically fastened roofing membranes
  - Secure All Purpose Bar and termination bars

Mule-Hide fasteners must be used to fasten the roof insulation, roof membrane, and All Purpose Bar. On a job-to-job basis, the Mule-Hide Technical Department may accept the use of non-Mule-Hide fasteners and/or insulation adhesives for attachment of Mule-Hide accepted insulation. Any non-Mule-Hide fastener and plate used must be approved by the Mule-Hide Technical Department prior to job start-up. Your local Mule-Hide sales representative can advise you of the acceptability of any proposed non-Mule-Hide fastener. The following fastener guidelines apply:

## Technical Specifications - #12 Drill Point Fasteners (Insulation fasteners)

A.	<u>Technical Specifications</u>	<u>Minimum Performance</u>
	Material	C-1022 Phillips Cold Heading Wire
	Thread OD	0.209 to 0.218 diameter
	Point	Double Flute Self-Drilling
	Corrosion Coating	Cathodic Epoxy Electrocoat
	Average Pull-out	600 lbs. - 3/4" plywood 480 lbs. - 22 gauge steel

Note: Additional information is available on our website at [www.mulehide.com](http://www.mulehide.com)

## Physical Characteristics - Drill Point & Heavy Duty Fasteners

### A. #12 Drill Point Fasteners (Insulation fasteners)

Screw Length*	Thread Length*	Pieces / Box*	Weight / Box*
1 5/8	Full	1000	12#
2 1/4	Full	1000	16#
2 7/8	Full	1000	19#
3 1/4	2 7/8	1000	22#
3 3/4	2 7/8	1000	25#
4 1/2	4	1000	30#
5	4	1000	32#
6	4	1000	38#
7	4	500	21#
8	4	500	24#

\*Approximate Values - Other sizes available as special order

### B. HD-14 Drill Fasteners (Membrane fasteners)

Screw Length*	Thread Length*	Pieces / Box*	Weight / Box*
1 1/4	Full	1000	14#
2	Full	1000	21#
3	2 7/8	1000	31#
4	3 7/8	1000	40#
5	3 7/8	1000	49#
6	3 7/8	500	29#
7	3 7/8	500	34#
8	3 7/8	500	38#

\*Approximate Values - Other sizes available as special order

C. Determine minimum screw length per following:

Wood Decks:	Fastener length must penetrate deck a minimum of 1"
Steel Decks:	Fastener length must penetrate deck a minimum of 1/2"
Structural Concrete Decks:	Fastener length must penetrate deck a minimum of 1"

### Method of Application

- A. Install fasteners with low speed variable drill with "Shorty" adapter, if possible, to prevent over-drill on fastening. Use a #3 Phillips bit to drill fasteners. Structural concrete should be pre-drilled with a hole 1/2" deeper than the fastener to be used using a masonry 3/16" carbide drill bit. **Caution:** Eye protection is recommended during the installation of all fasteners.

### General Requirements

- A. Plywood decks require a one-inch penetration from the top surface of the deck.
- B. Steel decks require 1/2" minimum deck penetration by the fastener. The threaded portion of the fastener must be secured to the deck. The fluted design of some steel decks require the use of longer fasteners to guarantee penetration in the fluted area.
- c. Structural concrete decks require the fastening of the insulation with Mule-Hide Concrete Fasteners and insulation plates. The fastener must penetrate the deck by at least one inch. It is suggested that each hole drilled in a concrete deck be at least 1/2" deeper than the potential penetration of the concrete fastener. The 1/2" area is for the residual filings left by the concrete after the drill has been removed.
- D. Gypsum, either poured or precast, cementitious fiber decks (tectum, etc.) and lightweight concrete decks must be secured with Mule-Hide TL Fasteners, Peel Rivets (a registered trademark of Creative Construction Components, Inc.) or an acceptable fastener approved by Mule-Hide Technical Department.
- E. All decks must have a pull-out resistance of 360 pounds minimum. Mule-Hide recommends a test installation be performed to check the pull-out resistance of the appropriate fastener prior to bidding the project. Pull-out tests should be performed by a qualified individual and include different sections of the roof to assure uniformity of the deck.

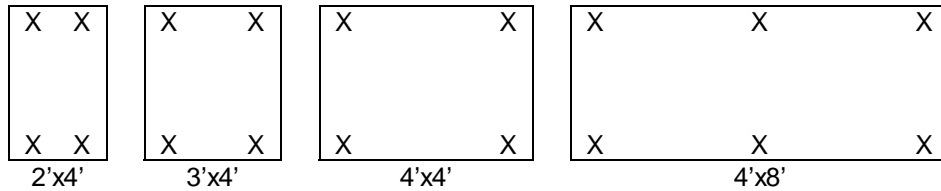
### Approved Fasteners

- A. Only approved Mule-Hide fasteners supplied by Mule-Hide Products Co. may be used on warranted Mule-Hide systems. **Caution:** Some fasteners have unusual design characteristics which could harm the membrane if used with the Mule-Hide membrane; therefore, it is recommended that Mule-Hide approved fasteners be used whenever possible.
- B. All fasteners shall be corrosion resistant coated and meet the corrosion resistance requirements of Factory Mutual Standard 4470.
- C. All fasteners shall be compatible with and suitable for the insulation used and the deck to be penetrated.

**Fastener Patterns - Insulation**

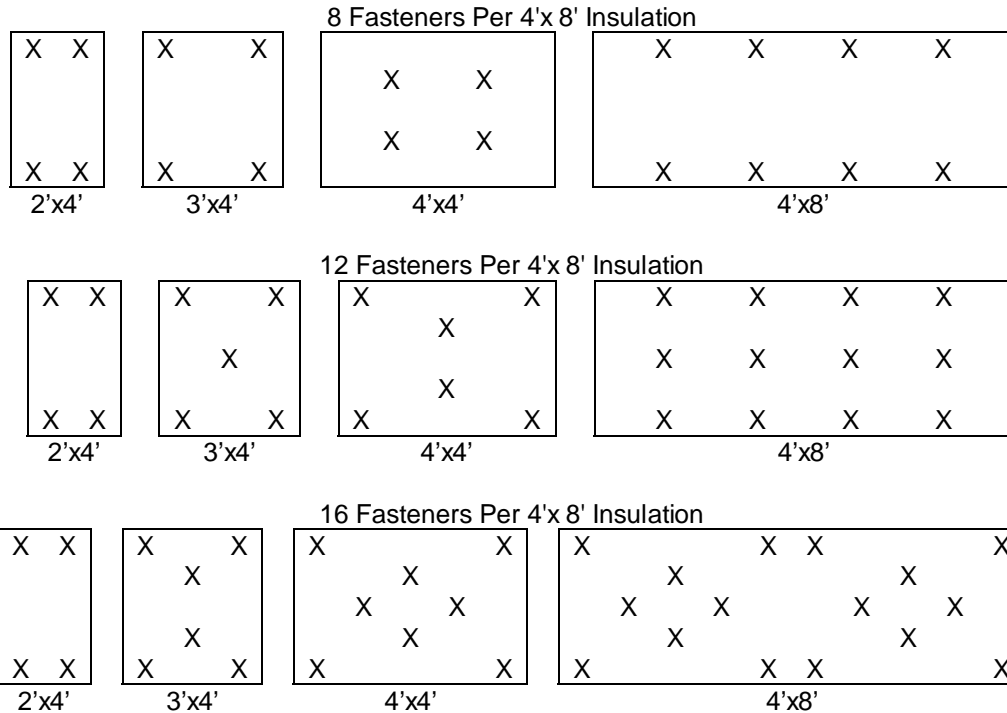
- A. Insulation shall be mechanically attached using approved fasteners per insulation manufacturers' specifications and FM wind uplift requirements. Unless the insulation manufacturer's fastening requirements are more stringent, Mule-Hide requires the following minimum fastening rates and suggests the following patterns:

**Mechanically Attached Systems**



All of the insulation must be pre-fastened to the deck with Mule-Hide fasteners and plates at a minimum as shown above. All fasteners must be at least six (6) inches from the edge of the board and centered as shown.

**Fully Adhered**



All of the insulation must be pre-fastened to the deck with Mule-Hide fasteners and plates at a minimum as shown above. All fasteners must be at least six (6) inches from the edge of the board and centered as shown.

**See attached details MHFM-208, MHFM-212, & MHFM-216 for examples of Factory Mutual Attachment patterns for those projects requiring Factory Mutual Approval.**

**Fasteners Available From Mule-Hide**

**Typical Fasteners** - Refer to Mule-Hide website at [www.mulehide.com](http://www.mulehide.com) for most current information.

Fastener (1) (2)	Uses	Roof Deck (3)
Mule-Hide DP #12	Insulation attachment	Steel, Wood
Mule-Hide HD-14	Insulation attachment System attachment	Steel, Wood, Concrete
Mule-Hide HD-15 (4)	System attachment	Steel, Wood, Concrete

**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. Contact Mule-Hide Technical Department for non-standard roof decks.
4. Required for Factory Mutual, mechanically attached systems

**Attachment of Wood Nailers**

- A. Wood nailers shall be firmly attached to the deck, wall or existing structurally sound surface, so as to resist a force of 200 pounds per linear foot in any direction (fastening 16 inch o.c. maximum is recommended for most applications). See below the Factory Mutual Loss Prevention Data Bulletin 1-49 for recommended type and size of fasteners, nailers and spacing:

**Factory Mutual  
Loss Prevention Bulletin 1-49 and Other Nailer Attachment**

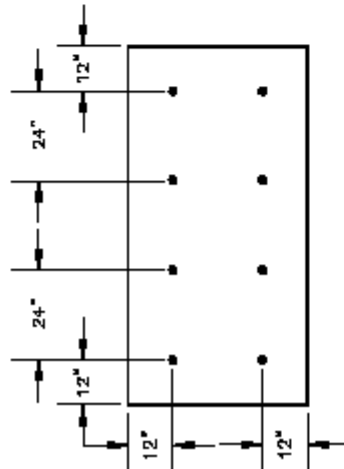
<u>Deck Type</u>	<u>Mule-Hide Fastener</u>	<u>Fastener Type</u>		
		<u>1/2" Dia. Anchor Bolts</u>	<u>3/8" Dia. Anchor Bolts</u>	<u>3/4" Dia. Structural Steel Posts</u>
1/2" to 5/8" Plywood	12" o.c.	N/A	N/A	N/A
5/8" or Greater Plywood	16" o.c.	N/A	N/A	N/A
Wood Plank	16" o.c.	N/A	N/A	N/A
Existing 2X Wood Nailers	16" o.c.	N/A	N/A	N/A
Steel Deck	16" o.c.	N/A	N/A	N/A
Concrete	16" o.c.	4'0" o.c.*	2'8" o.c.**	N/A
Structural Steel	N/A	N/A	N/A	4'0" o.c.
Lightweight Concrete	16" o.c.	N/A	N/A	N/A

\* Within 8' of all corners, spacing shall be 2'0" o.c.

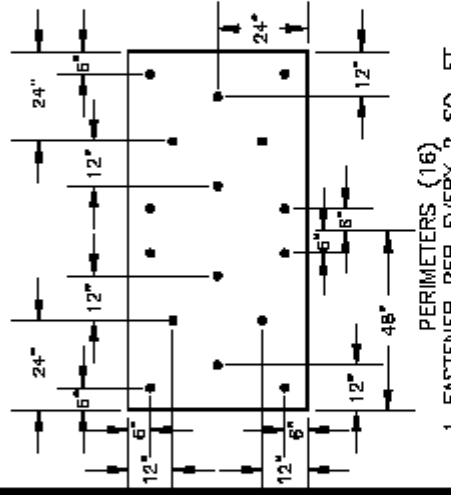
\*\* Within 8' of all corners, spacing shall be 16" o.c.

**NOTES:**

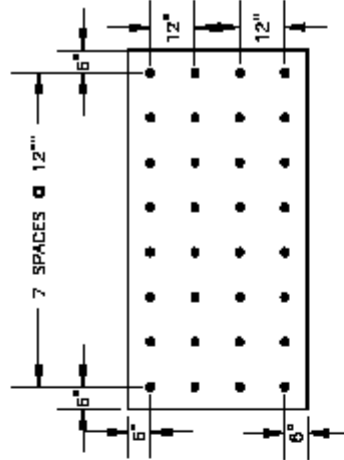
1. DETAILS TO BE USED IN CONJUNCTION WITH STANDARD GUIDE SPECIFICATIONS CONTAINING REQUIREMENTS FOR NAILERS, INSULATION, SLIPSHEETS, ETC.
2. MULE-HIDE INSULATION FASTENERS AND 3" DIAMETER PLATES MUST BE USED FOR INSULATION ATTACHMENT.
3. REFER TO MULE-HIDE WIND UPLIFT RATINGS FOR APPROPRIATE FASTENER DENSITY REQUIRED.
4. FASTENER DENSITY INCREASES BASED ON THE FOLLOWING:
  - 50% FOR PERIMETERS WITH A MINIMUM OF 1 FASTENER EVERY 2 SQUARE FEET NOT TO EXCEED 1 FASTENER EVERY 1 SQUARE FOOT
  - CONSTANT DENSITY OF 1 FASTENER EVERY 1 SQUARE FOOT FOR CORNERS.



FIELD (8)  
1 FASTENER PER EVERY 4 SQ. FT.



PERIMETERS (16)  
1 FASTENER PER EVERY 2 SQ. FT.



CORNERS (32)  
1 FASTENER PER EVERY 1 SQ. FT.

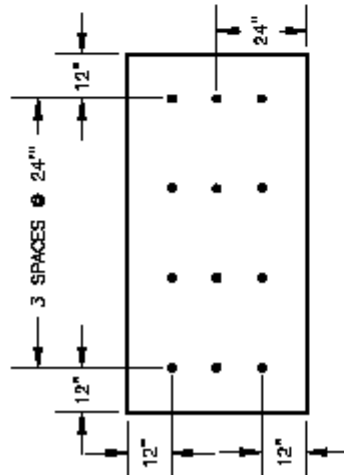
**MULE-HIDE  
PRODUCTS CO., INC.  
05/01/2007**

**FM - 8 FIELD FASTENERS  
PER 4' X 8' BOARD PATTERN LAYOUT  
SYSTEMS;  
ALL SYSTEMS**

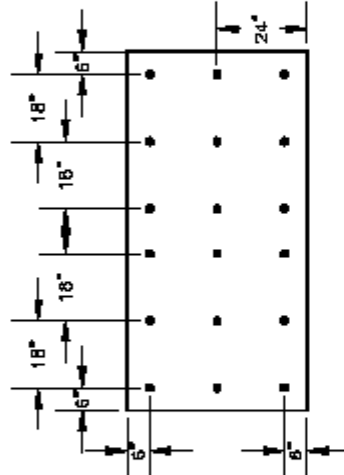
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MHFM-208**

**NOTES:**

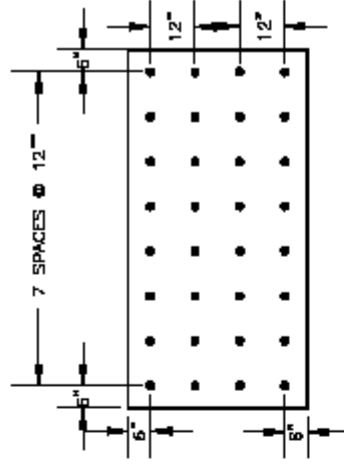
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  - CONSTANT DENSITY OF 1 FASTENER EVERY 1 SQUARE FOOT FOR CORNERS.



FIELD (12)  
1 FASTENER PER EVERY 2.66 SQ. FT.



PERIMETERS (18)  
1 FASTENER PER EVERY 1.77 SQ. FT.



CORNERS (32)  
1 FASTENER PER EVERY 1 SQ. FT.

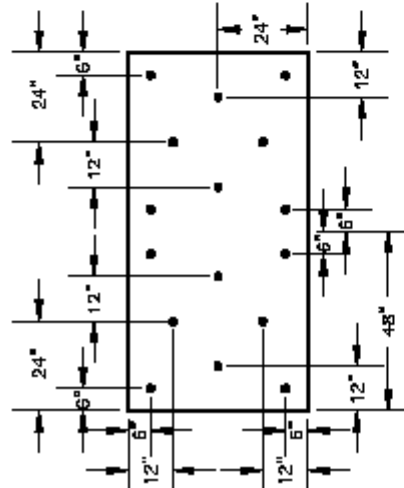
**MULE-HIDE  
PRODUCTS CO., INC.  
05/01/2007**

**FM - 12 FIELD FASTENERS  
PER 4' X 8' BOARD PATTERN LAYOUT  
SYSTEMS:  
ALL SYSTEMS**

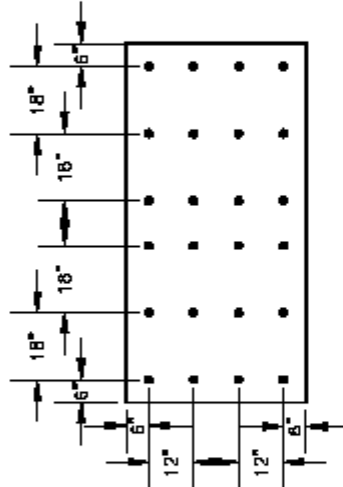
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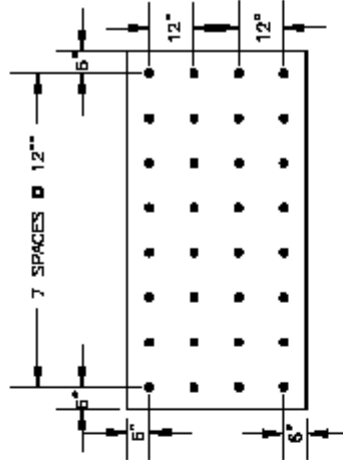
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  - CONSTANT DENSITY OF 1 FASTENER EVERY 1 SQUARE FOOT FOR CORNERS.



FIELD (16)  
1 FASTENER PER EVERY 2 SQ. FT.



PERIMETERS (24)  
1 FASTENER PER EVERY 1.33 SQ. FT.



CORNERS (32)  
1 FASTENER PER EVERY 1 SQ. FT.

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05/01/2007**

**FM - 16 FIELD FASTENERS  
PER 4' X 8' BOARD PATTERN LAYOUT  
SYSTEMS;  
ALL SYSTEMS**

**DETAIL NO:  
MHFM-216**