



# Technical Guide

## Single-Ply Insulation Attachment Guidelines

July 2024

### SINGLE-PLY INSULATION ATTACHMENT GUIDELINES

#### Attachment Overview

Mule-Hide offers a variety of Insulation Fasteners and plates as well as Low-Rise Foam Adhesive:

Mule-Hide fasteners or insulation adhesive must be used when attaching the roof insulation on all warranted projects. On a job-to-job basis, the Mule-Hide Technical Department may accept the use of non-Mule-Hide products for attachment of Mule-Hide accepted insulation. Any non-Mule-Hide fastener and plate or adhesive must obtain written approval by the Mule-Hide Technical Department prior to job start-up. Your local Mule-Hide Territory Manager can assist you in contacting the Mule-Hide Technical Department to inquire about any proposed non-Mule-Hide product.

#### Mule-Hide Brand Insulation Fasteners:

- **Drill Point Fasteners (#12)**  
Primarily used for insulation attachment in Fully Adhered Roofing Systems. Specifically for Wood Plank, Plywood, and Steel decks.
- **Pre-Assembled Fastener System (#12 and 3" Insulation Plate)**  
Pre-Assembled fastener and insulation plate specifically for Wood Plank, Plywood, and Steel decks.
- **HDP Fasteners (#14)**  
Can be used for insulation attachment in Fully Adhered Roofing Systems or membrane securement in Mechanically Fastened Roofing Systems. Specifically for Wood Plank, Plywood, OSB, Steel, and Structural Concrete decks.
- **EHD Fasteners (#15)**  
Can be used for insulation attachment in Fully Adhered Roofing Systems or membrane securement in Mechanically Fastened Roofing Systems. Specifically for Wood Plank, Plywood, OSB and Steel decks.
- **LWG Fasteners**  
Can be used for insulation attachment in Fully Adhered Roofing Systems specifically for Lightweight Insulating Concrete and Gypsum decks.
- **TL Fasteners (and Insulation Plates)**  
Can be used for insulation attachment in Fully Adhered Roofing Systems specifically for Cementitious Wood Fiber, Lightweight Insulating Concrete and Gypsum decks.
- **Tru-Spike Fasteners**  
Can be used for insulation attachment in Fully Adhered Roofing Systems or membrane securement in Mechanically Fastened Roofing Systems. Specifically for Structural Concrete decks.
- **3" Insulation Plate**  
Can be used in conjunction with Drill Point, HDP, EHD, and Tru-Spike fasteners for insulation attachment in Fully Adhered Roofing Systems.
- **3" LWG Metal Plate**  
Can be used in conjunction with LWG fasteners for insulation attachment in Fully Adhered Roofing Systems.

#### Minimum Fastener Embedment / Penetration based on Deck type:

- **Plywood, Wood Plank, and OSB decks** require a 3/4" penetration through the bottom surface of the deck.
- **Steel decks** require 3/4" minimum deck penetration by the fastener. The threaded portion of the

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fastener must engage the deck. Fasteners must engage the top rib of fluted steel decks. Fastening through the bottom rib of a fluted steel deck is not permitted.

- **Structural Concrete decks** require the fastener to penetrate the deck 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 additional 1/2" depth is for the residual filings left by the concrete after the drill has been removed.
- **Gypsum, either poured or precast, cementitious fiber decks (tectum, etc.).** Minimum embedment and pre-drilling requirements are on the Product Data Sheet for these fasteners as they can vary from 1-1/2" to 2-1/2" of embedment.
- **Lightweight Insulating Concrete over Steel or Structural Concrete.** It is possible to fasten directly into the Lightweight Insulating Concrete if the minimum pullout for the tested fastener is achieved. If this cannot be achieved by a pull test then fastening to the structural deck below must occur, see the requirements for these deck types above.

### General Requirements:

All decks must have a minimum pull-out resistance of **300** pounds to be considered for fully adhered projects. For a mechanically attached project, a minimum pull-out resistance of **360** pounds is required. 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. Instructions for the completion of a pull test are outlined in Technical Bulletin 07-2001.

### Insulation Adhesive:

- **Helix<sup>®</sup> Max Low-Rise Adhesive**
  - A low-rise, VOC-free, construction-grade, two-component polyurethane adhesive designed to bond Mule-Hide insulations to a variety of deck types.
  - Available in Drums, Jugs, Dual Tanks, and Dual Cartridges.
  - Substrate compatibility, and coverage rate requirements are available on the various Helix Max Product Data Sheets.

Refer to Mule-Hide's specifications for requirements for wind speed coverage greater than **55 MPH**.

Bead Spacing Requirements				
Warranted wind speed of 55 MPH and 20-Year Max				
Building Height	Perimeter Width	Bead Spacing		
		Field	Perimeter	Corner
0-25'	4 Feet	12" OC	6" OC	6" OC
26'-49'	8 Feet	12" OC	6" OC	6" OC
50'-74'	12 Feet	12" OC	6" OC	6" OC
75'-100'	16 Feet	12" OC	6" OC	6" OC
101' or greater	Contact Mule-Hide Technical Department			

### Insulation Fasteners:

- **Mule-Hide insulation fastening rates for Fully Adhered Systems**
  - Mule-Hide's minimum fastening rate is 1 per 2 SF or 16 plates and fasteners per board.
  - Based on deck and or insulation type reduced fastening patterns may be used.
- **Reduced insulation fastening rates for Fully Adhered Systems**
  - Reduced patterns are limited to Structural Concrete, Steel (min 22ga.), 5/8" Plywood, and min 1.5" Wood Plank Decks.
  - Maximum warranty terms for decks using reduced fastening rates listed is 20-years and 72 MPH.

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## Single-Ply Insulation Attachment Guidelines

- Maximum building height for reduced patterns is 50' in height.
- Rates are based on the single or top layer of insulation (or cover board) installed.
- Minimum fastening rates for various thicknesses and types of Mule-Hide Insulations and Cover Boards are outlined below.

Refer to Mule-Hide's specifications for requirements for wind speed coverage or buildings greater than 50' in height.

<b>Minimum Mule-Hide Fastener Requirements</b>			
Warranted wind speed up to 72 MPH, Max 50' building height			
Insulation Type or Cover Board	Fasteners per 4' x 8' board		
	Field	Perimeter	Corner
Mule-Hide Polyisocyanurate (1 or 2)- Min 2" thick (top layer)	8	8	8
Mule-Hide Polyisocyanurate (1 or 2)- Min 1.5" up to 2" thick	12	12	12
Mule-Hide Polyisocyanurate (1 or 2)- Min 1.0" up to 1.5" thick	16	16	16
Poly-ISO (1or 2) HD (1/2" thick) - Installed over Approved Insulation	12	12	12
Poly-ISO1 HD Plus (1/2" thick) -Installed over an Approved Insulation	8	8	8
Structodek HD Wood Fiberboard - Min 1/2" thick- Installed over Approved Insulation	16	16	16
Dens Deck Prime or Securock - Min 1/4" thick - Installed over Approved Insulation	12	12	12
Dens Deck Prime or Securock - Min 1/2" thick - Installed over Approved Insulation	8	8	8
OSB - Min 7/16" thick - Installed over Approved Insulation	17	17	17
Approved OSB/Polyisocyanurate Composite - Min 2" thick	17	17	17

- **Mule-Hide insulation fastening Mechanically Fastened Systems**
  - Standard pattern is 6 plates and fasteners per 4' x 8' board
- **Reduced insulation fastening rates for Mechanically Fastened Systems**
  - When the top layer of insulation is Poly-Iso greater than 2" in thickness then the pattern can be reduced to 5 plates and fasteners per 4' x 8' board

### 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,

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- B. Mule-Hide requires the following minimum fastening rates from the chart above be achieved following the patterns in the attached drawings. All fasteners must be at least six (6) inches from the edge of the board and centered as shown in the attached drawings.

Information and details included are intended for Mule-Hide's sole benefit for the limited purpose of considering a project for the manufacturer's warranty requested. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the responsibility of the owner and/or architect to design the roof and select the roofing system. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements.

# FASTENING PATTERN GUIDELINE DETAILS

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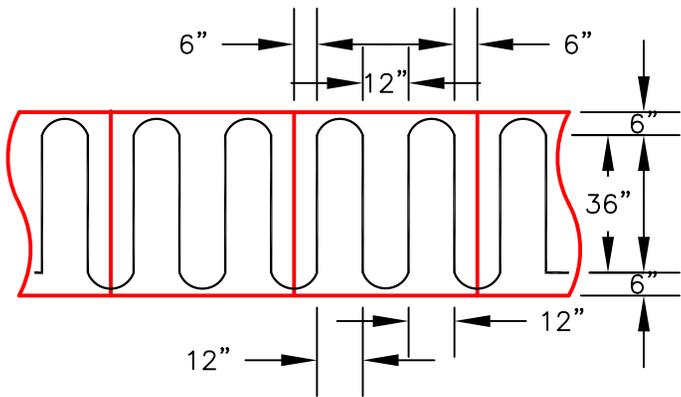


FIGURE 1  
INSTALLATION USING 12" O.C.  
BEADS ON 4' X 4' BOARDS

\* MAXIMUM 4'X4' INSULATION BOARDS  
WHEN ADHESIVE IS DISPENSED AT  
12" ON CENTER OR WHEN BOARDS  
EXCEED 4" THICKNESS

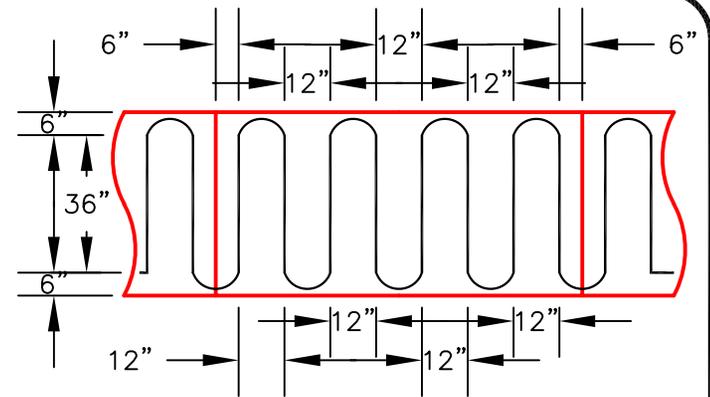


FIGURE 3  
INSTALLATION USING 12" O.C.  
BEADS ON 4' X 8' BOARDS

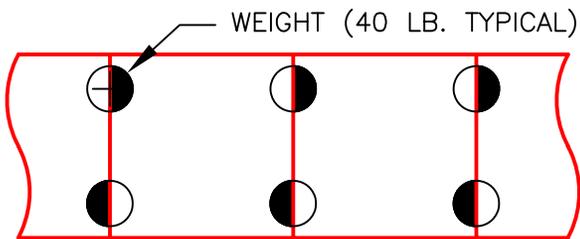


FIGURE 2  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 4' BOARDS

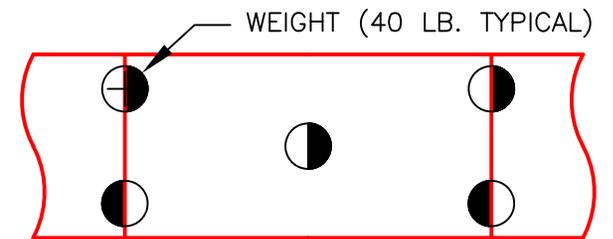


FIGURE 4  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 8' BOARDS

\* SEE HELIX MAX PRODUCT DATA SHEET FOR  
COVERAGE RATES

**MULE-HIDE  
PRODUCTS CO., INC.**

**HELIX MAX FOAM ADHESIVE  
12" RIBBON PATTERN  
SYSTEMS:  
ALL SYSTEMS**

**DETAIL NO.:**  
**MHHA-UN-12**  
REVISION DATE: 07/01/2024

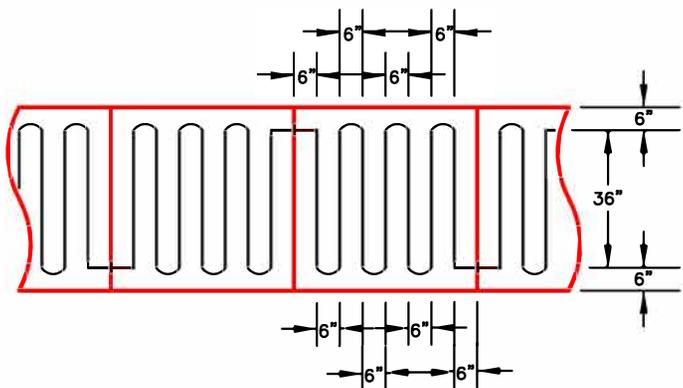


FIGURE 1  
INSTALLATION USING 6" O.C.  
BEADS ON 4' X 4' BOARDS

\* MAXIMUM 4'X4' INSULATION BOARDS  
WHEN ADHESIVE IS DISPENSED AT  
12" ON CENTER OR WHEN BOARDS  
EXCEED 4" THICKNESS

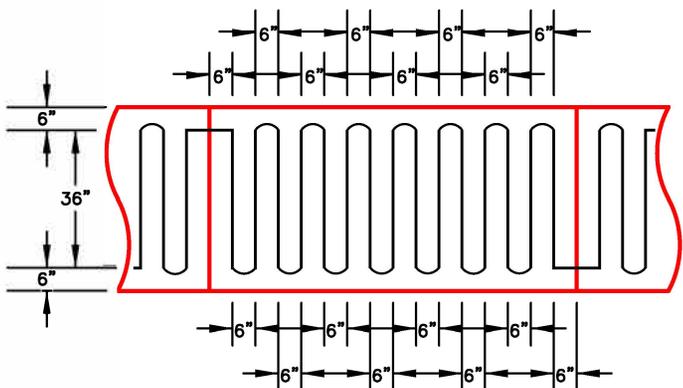


FIGURE 3  
INSTALLATION USING 6" O.C.  
BEADS ON 4' X 8' BOARDS

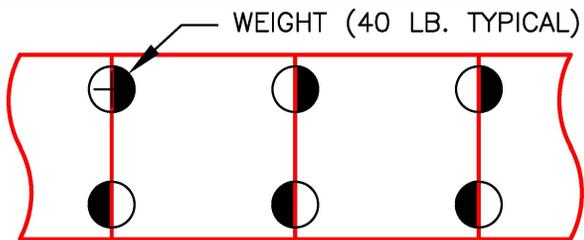


FIGURE 2  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 4' BOARDS

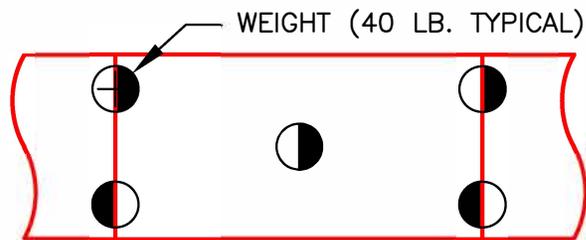


FIGURE 4  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 8' BOARDS

\* SEE HELIX MAX PRODUCT DATA SHEET FOR  
COVERAGE RATES

**MULE-HIDE  
PRODUCTS CO., INC.**

**HELIX MAX FOAM ADHESIVE  
6" RIBBON PATTERN  
SYSTEMS:  
ALL SYSTEMS**

**DETAIL NO.:  
MHHA-UN-6**

REVISION DATE: 07/01/2024

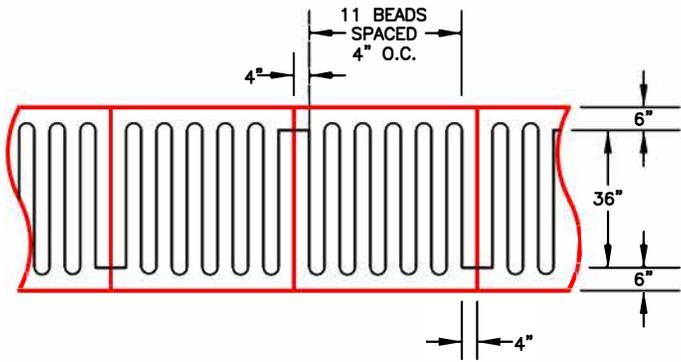


FIGURE 1  
INSTALLATION USING 4" O.C.  
BEADS ON 4' X 4' BOARDS

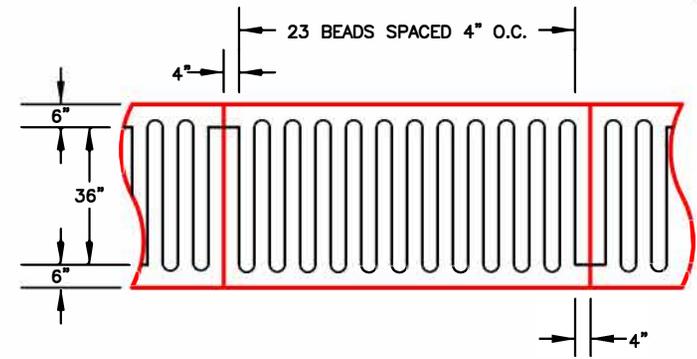


FIGURE 3  
INSTALLATION USING 4" O.C.  
BEADS ON 4' X 8' BOARDS

\* MAXIMUM 4'X4' INSULATION BOARDS  
WHEN ADHESIVE IS DISPENSED AT  
12" ON CENTER OR WHEN BOARDS  
EXCEED 4" THICKNESS

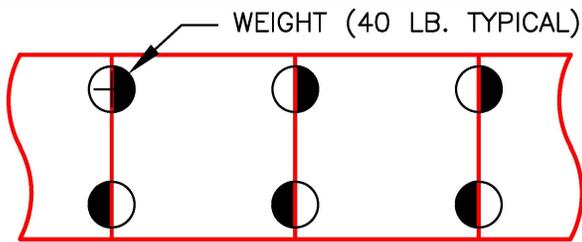


FIGURE 2  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 4' BOARDS

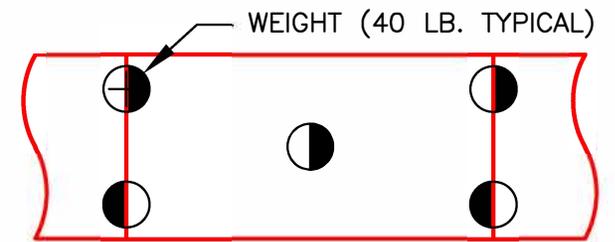


FIGURE 4  
RECOMMENDED WEIGHT  
PLACEMENT ON 4' X 8' BOARDS

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COVERAGE RATES

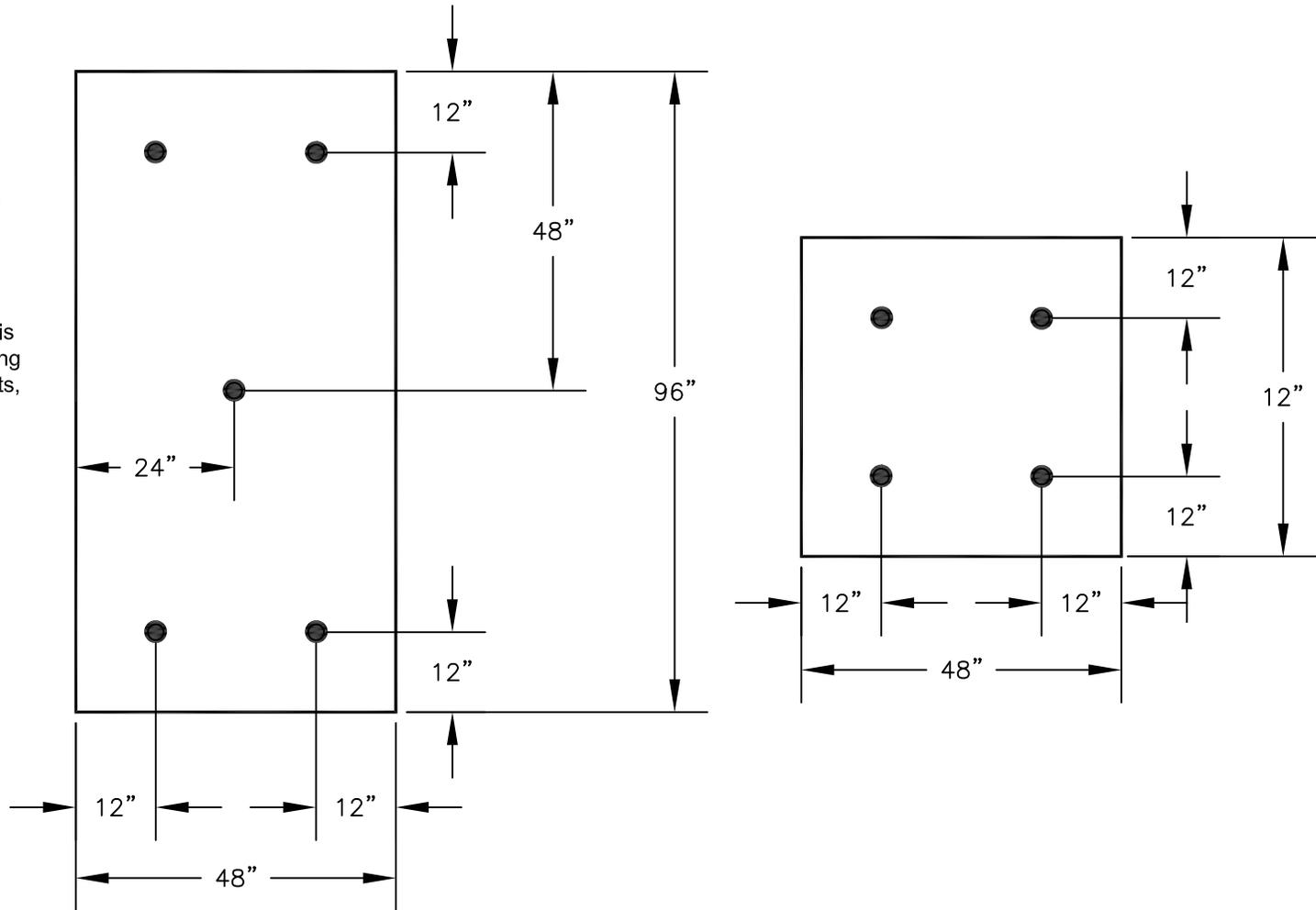
**MULE-HIDE  
PRODUCTS CO., INC.**

**HELIX MAX FOAM ADHESIVE  
4" RIBBON PATTERN  
SYSTEMS:  
ALL SYSTEMS**

**DETAIL NO.:**  
**MHHA-UN-4**  
REVISION DATE: 07/01/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 6.4 SF (5 per 4x8)  
Fastened - 1 per 4 SF (4 per 4x4)**

**SYSTEMS:**

**MECHANICALLY ATTACHED**

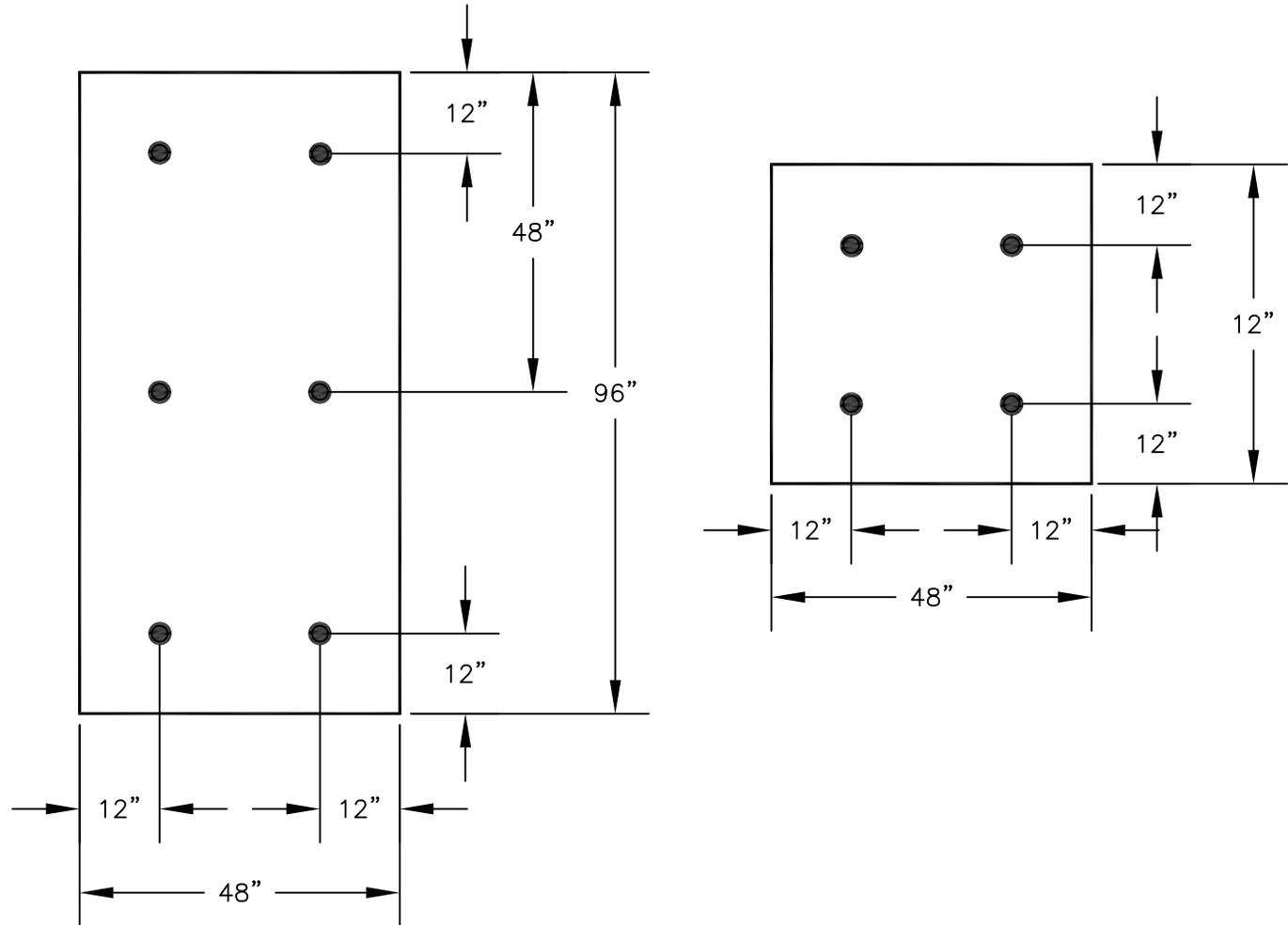
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REVISION DATE: 6/24/2024

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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 5.33 SF (6 per 4x8)  
Fastened - 1 per 4 SF (4 per 4x4)**

**SYSTEMS:  
INDUCTION WELDED  
MECHANICALLY ATTACHED**

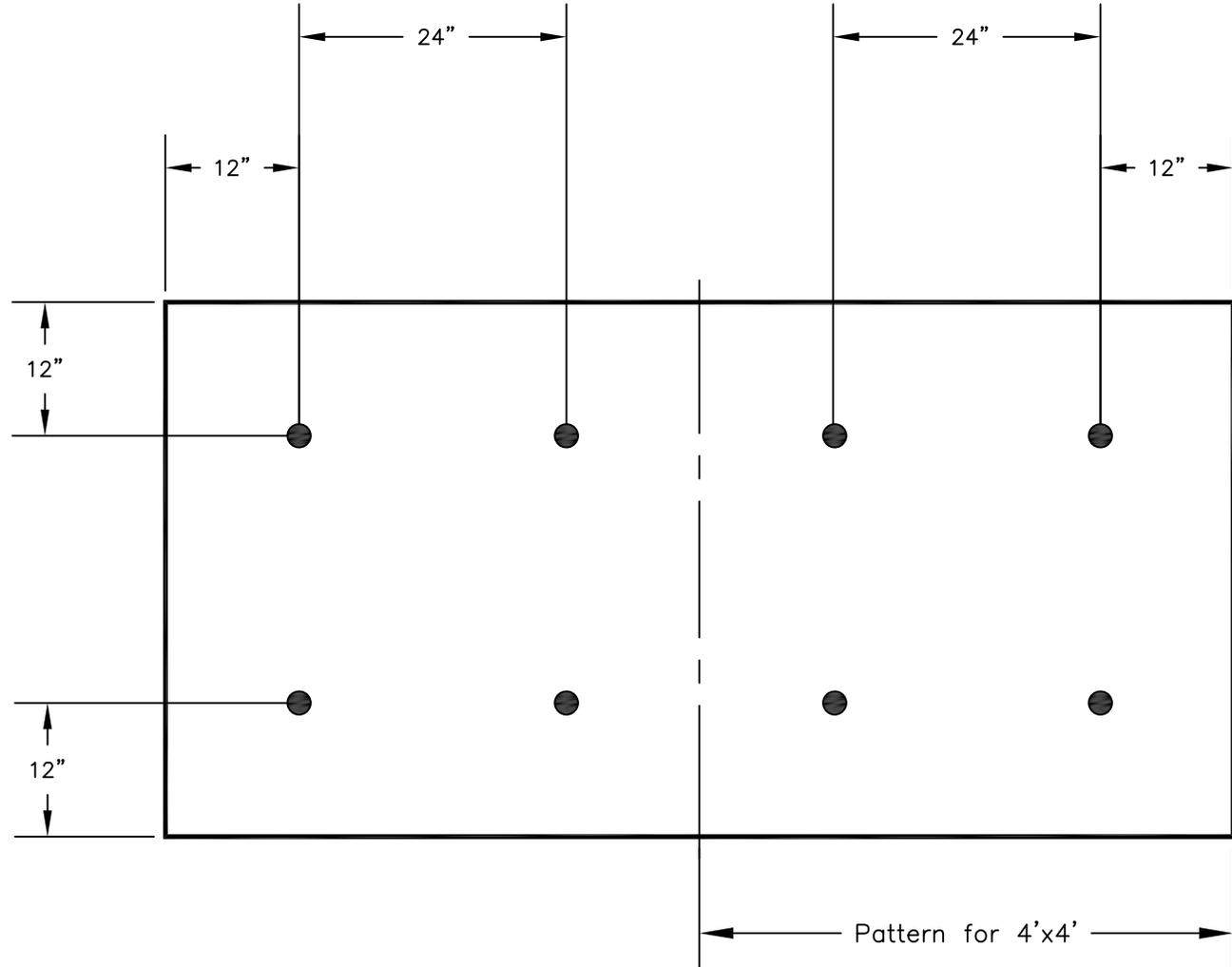
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**INS-UN-6F-4H**

REVISION DATE: 6/24/2024

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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 4 SF (8 per 4x8)  
Fastened - 1 per 4 SF (4 per 4x4)**

**SYSTEMS:  
INDUCTION WELDED  
MECHANICALLY ATTACHED**

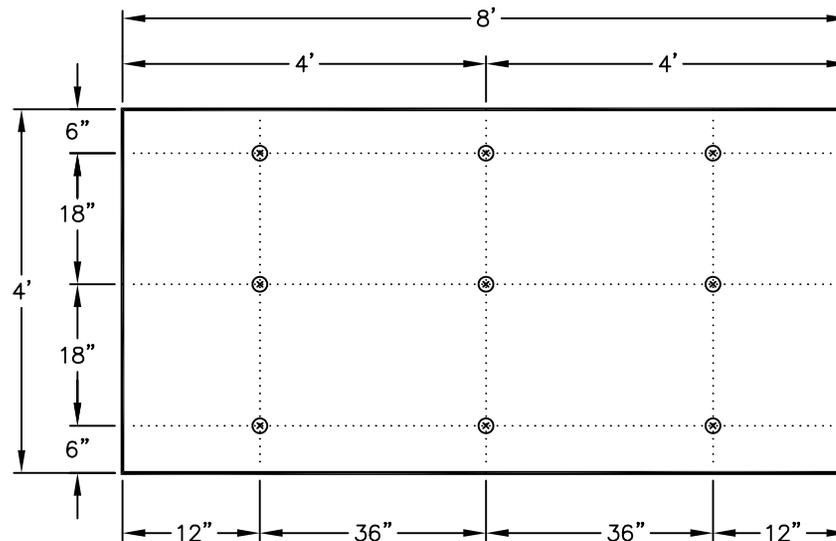
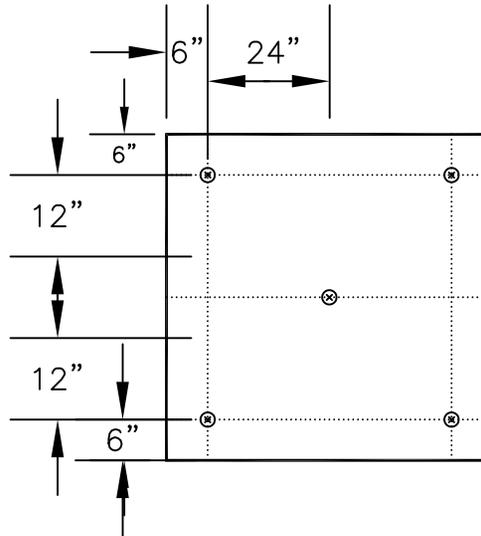
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REVISION DATE: 6/24/2024

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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 3.55 SF (9 per 4x8)  
Fastened - 1 per 3.2 SF (5 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

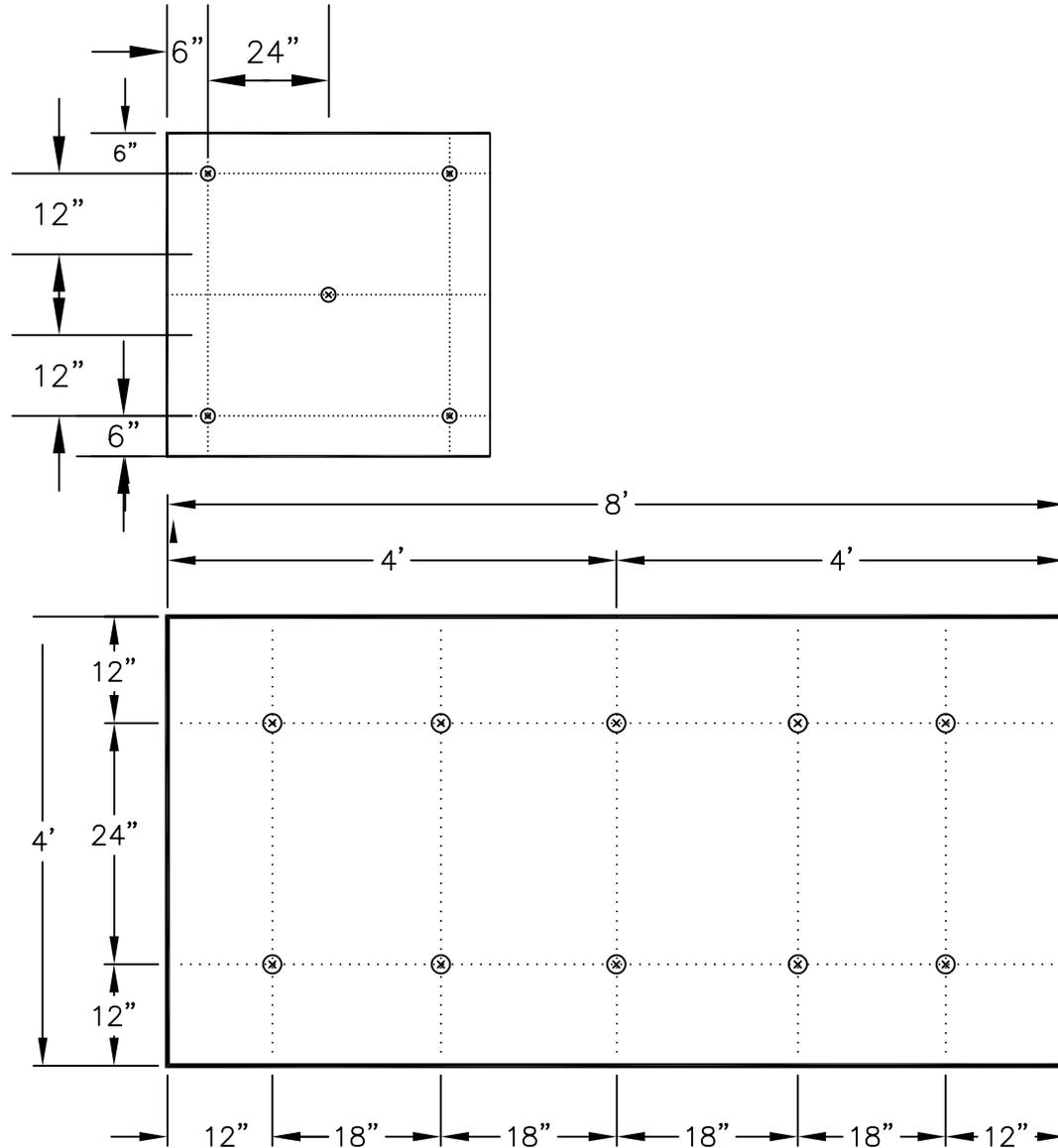
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REVISION DATE: 6/24/2024

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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 3.2 SF (10 per 4x8)  
Fastened - 1 per 3.2 SF (5 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

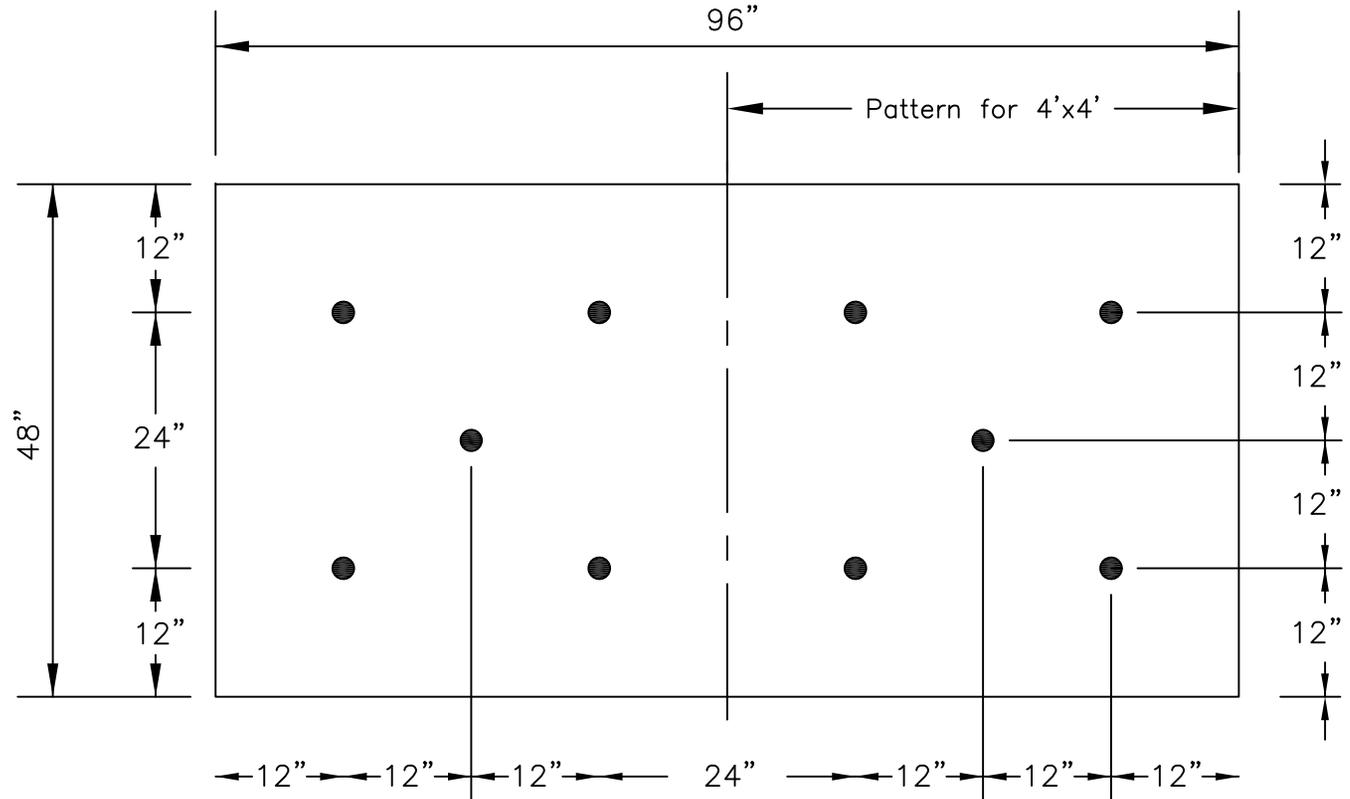
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REVISION DATE: 6/24/2024

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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 3.2 SF (10 per 4x8)  
Fastened - 1 per 3.2 SF (5 per 4x4)**

**SYSTEMS:  
INDUCTION WELDED  
MECHANICALLY ATTACHED**

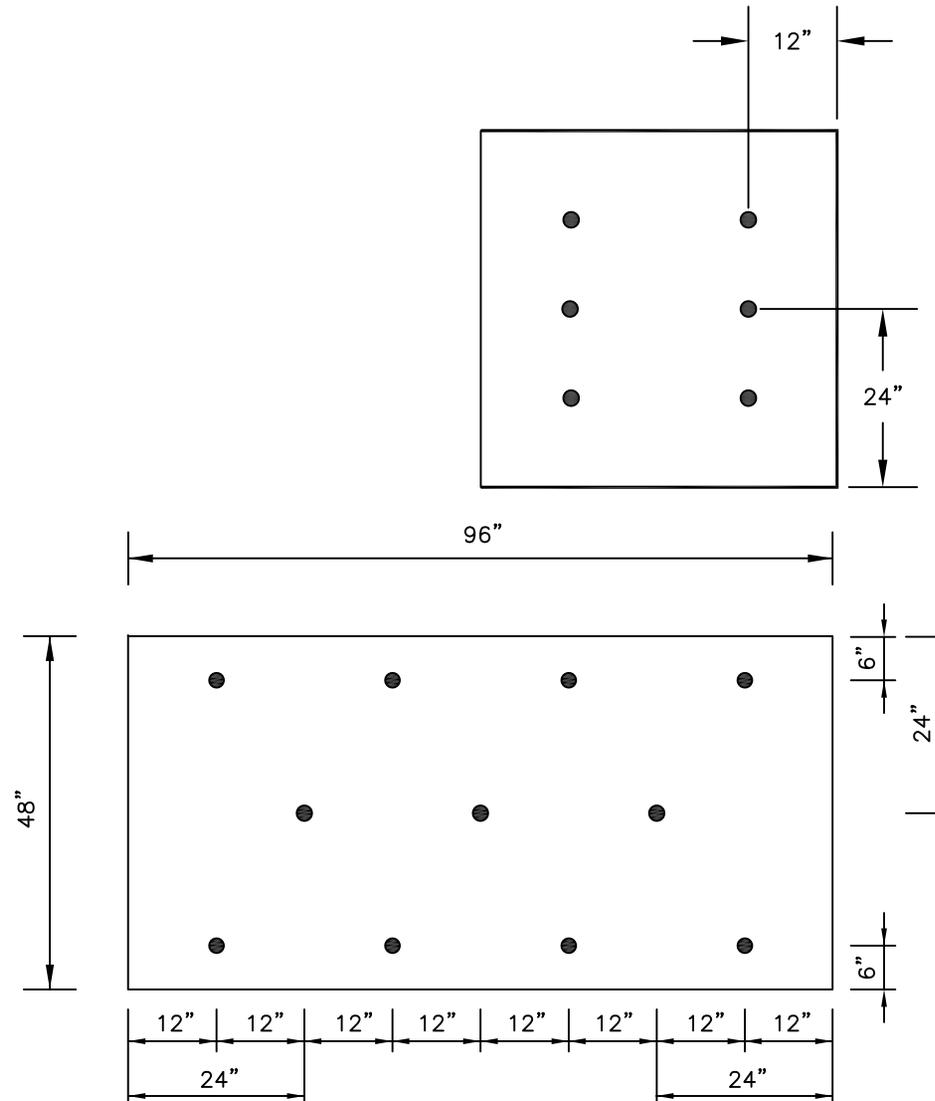
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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2.91 SF (11 per 4x8)  
Fastened - 1 per 2.67 SF (6 per 4x4)**

**SYSTEMS:**

**MECHANICALLY ATTACHED**

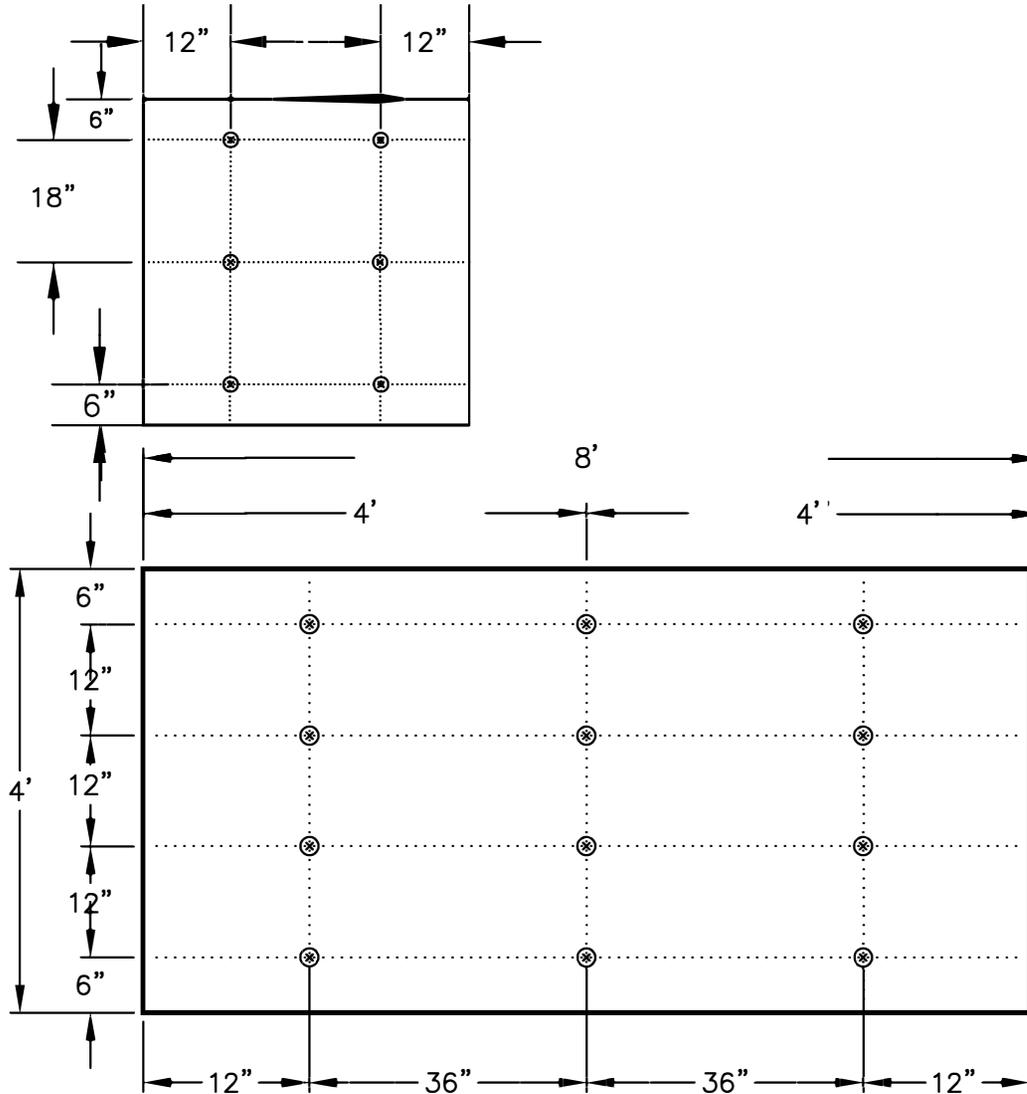
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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2.67 SF (12 per 4x8)  
Fastened - 1 per 2.67 SF (6 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

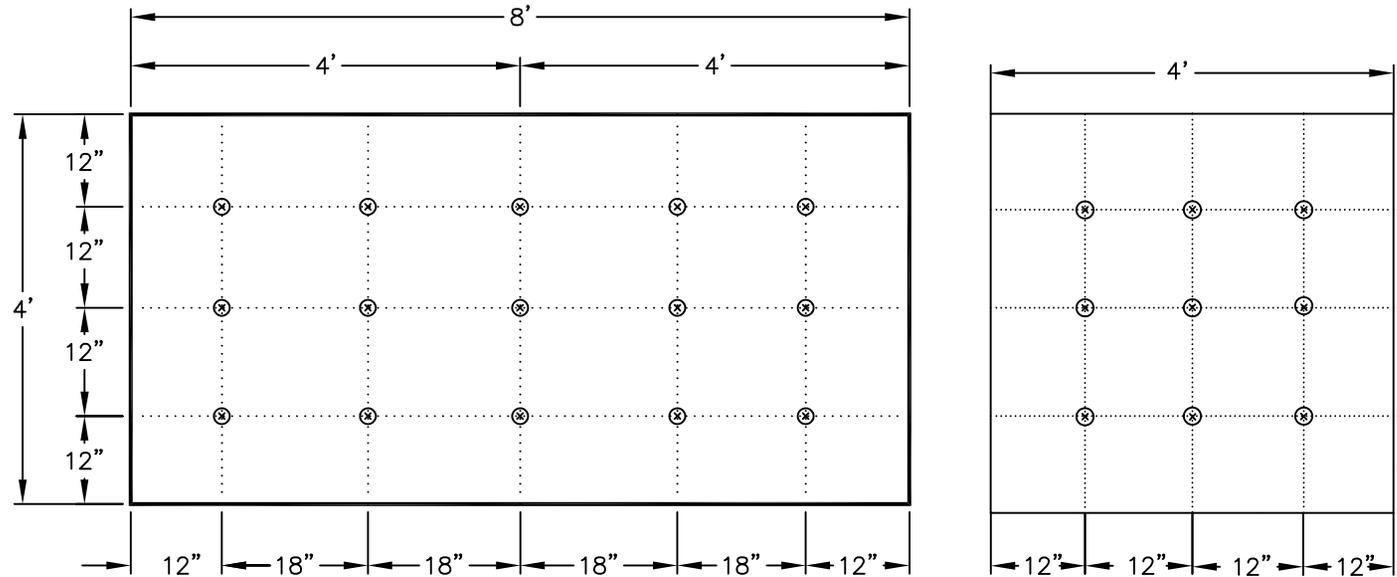
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**INS-IW-12F-6H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2.13 SF (15 per 4x8)  
Fastened - 1 per 1.77 SF (9 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

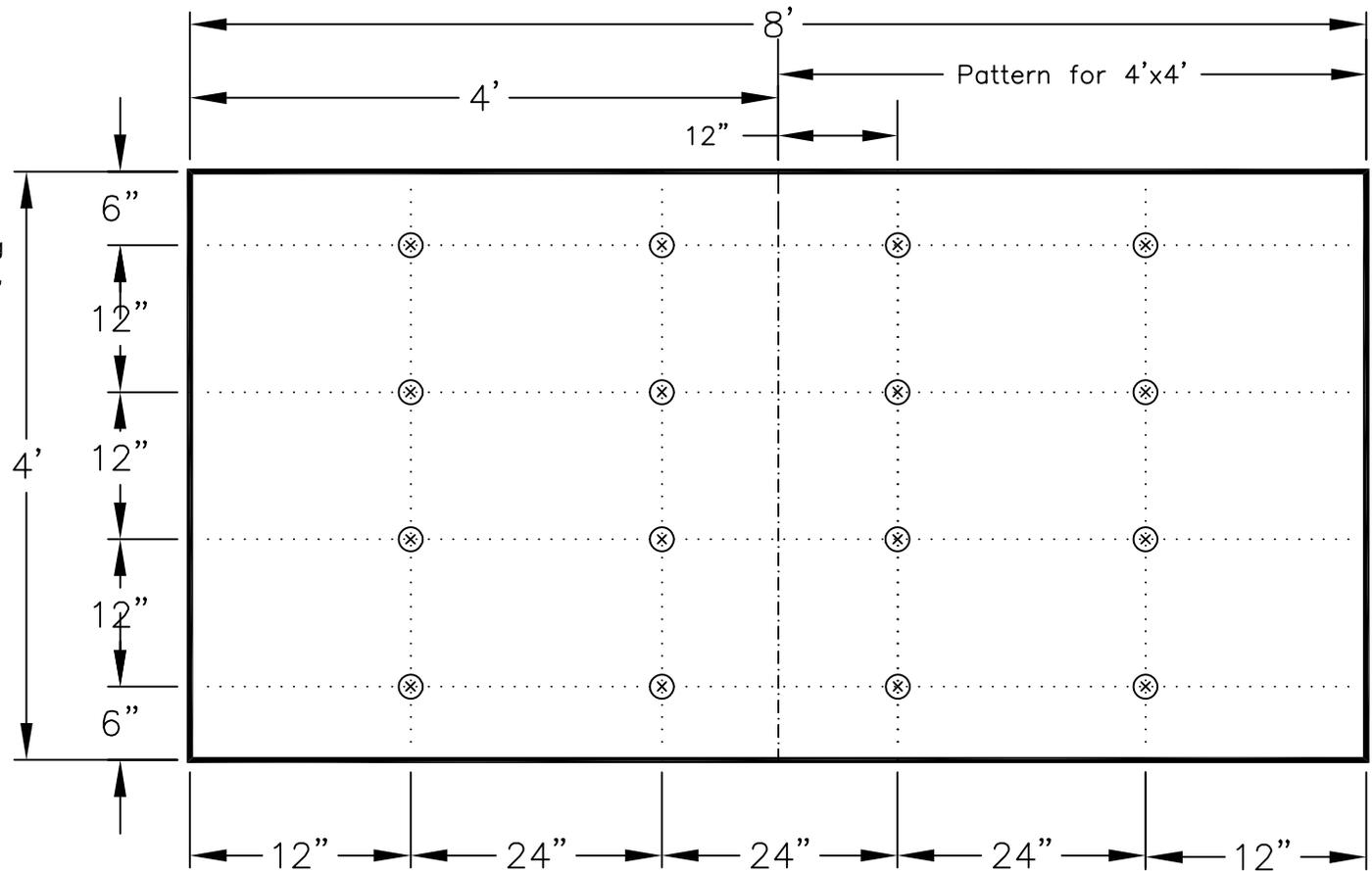
**DETAIL NO.:**

**INS-IW-15F-9H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2 SF (16 per 4x8)  
Fastened - 1 per 2 SF (8 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

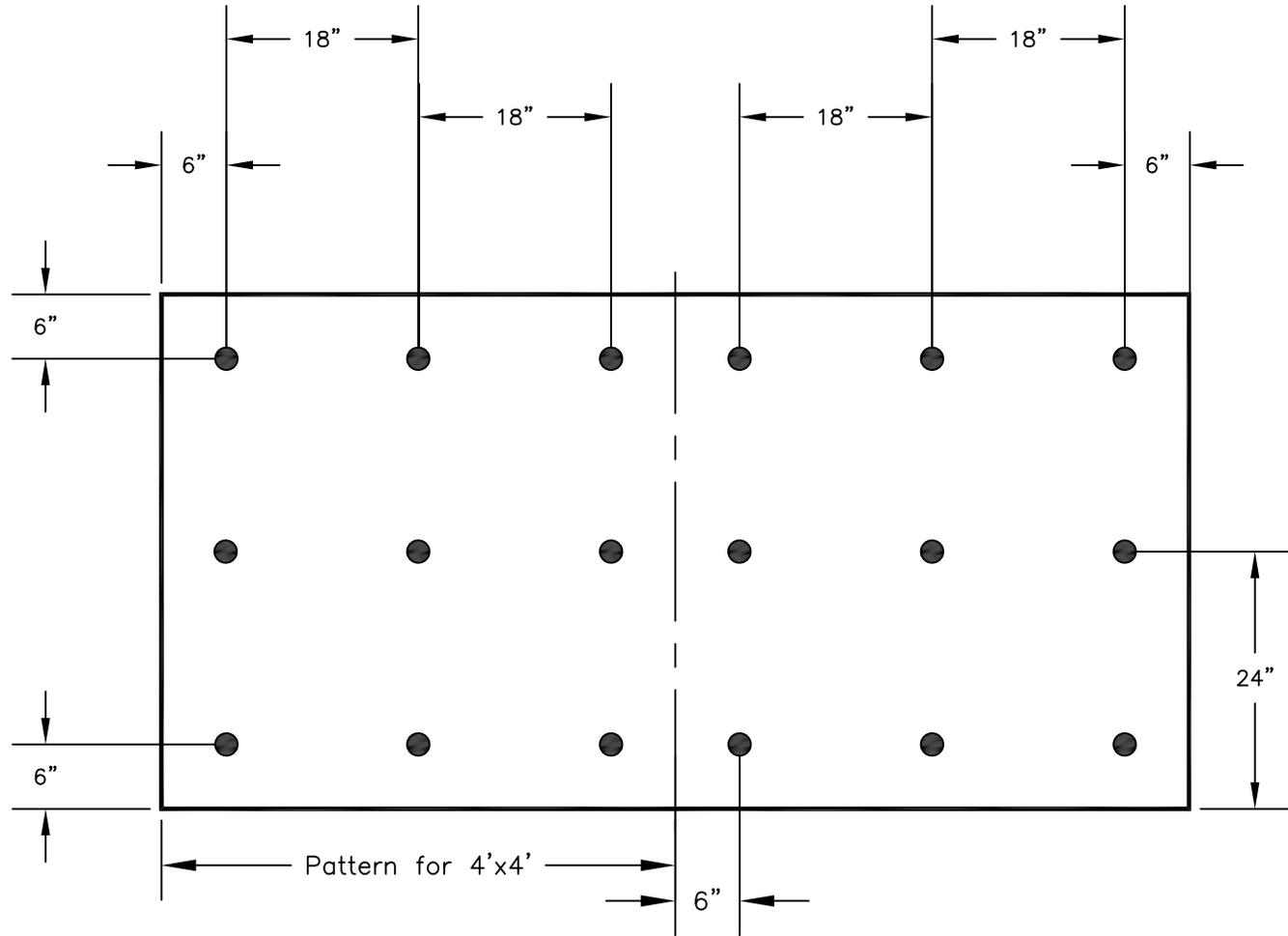
**DETAIL NO.:**

**INS-IW-16F-8H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.77 SF (18 per 4x8)  
Fastened - 1 per 1.77 SF (9 per 4x4)**

**SYSTEMS:  
INDUCTION WELDED  
FULLY ADHERED**

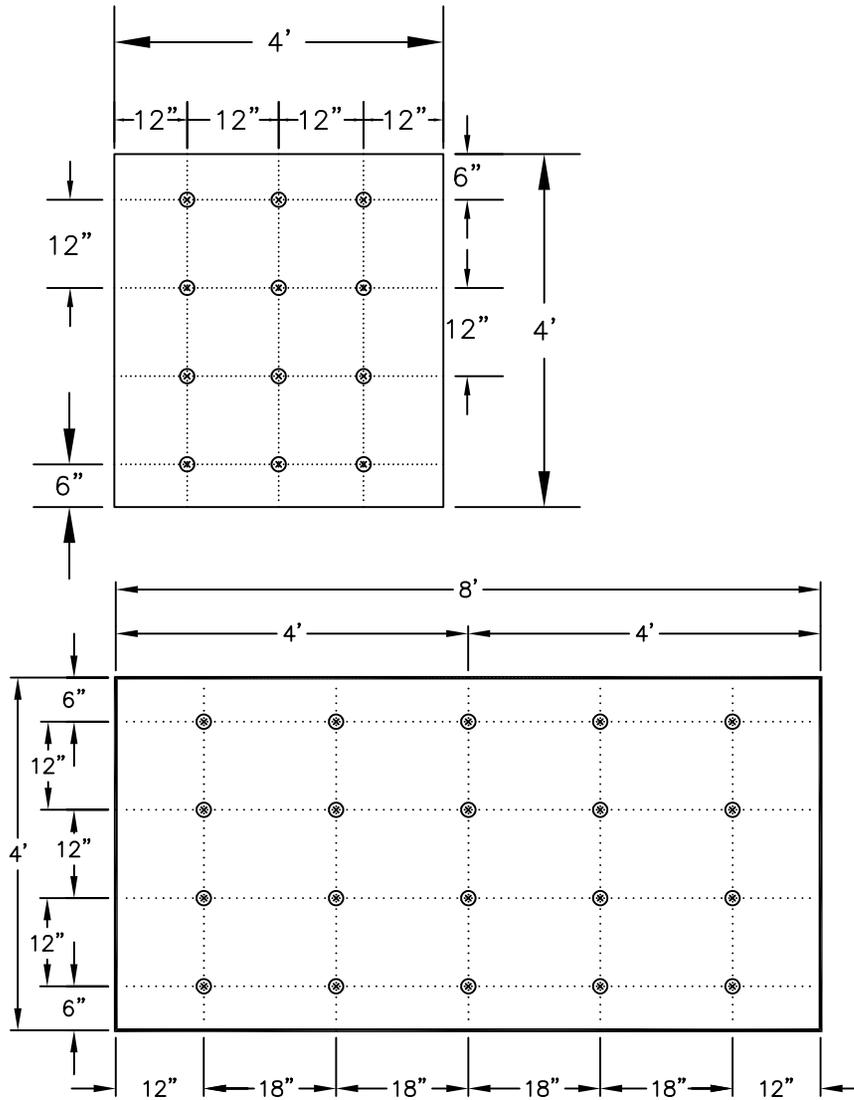
**DETAIL NO.:**

**INS-UN-18F-9H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.6 SF (20 per 4x8)  
Fastened - 1 per 1.33 SF (12 per 4x4)**

**SYSTEMS:**

**INDUCTION WELDED**

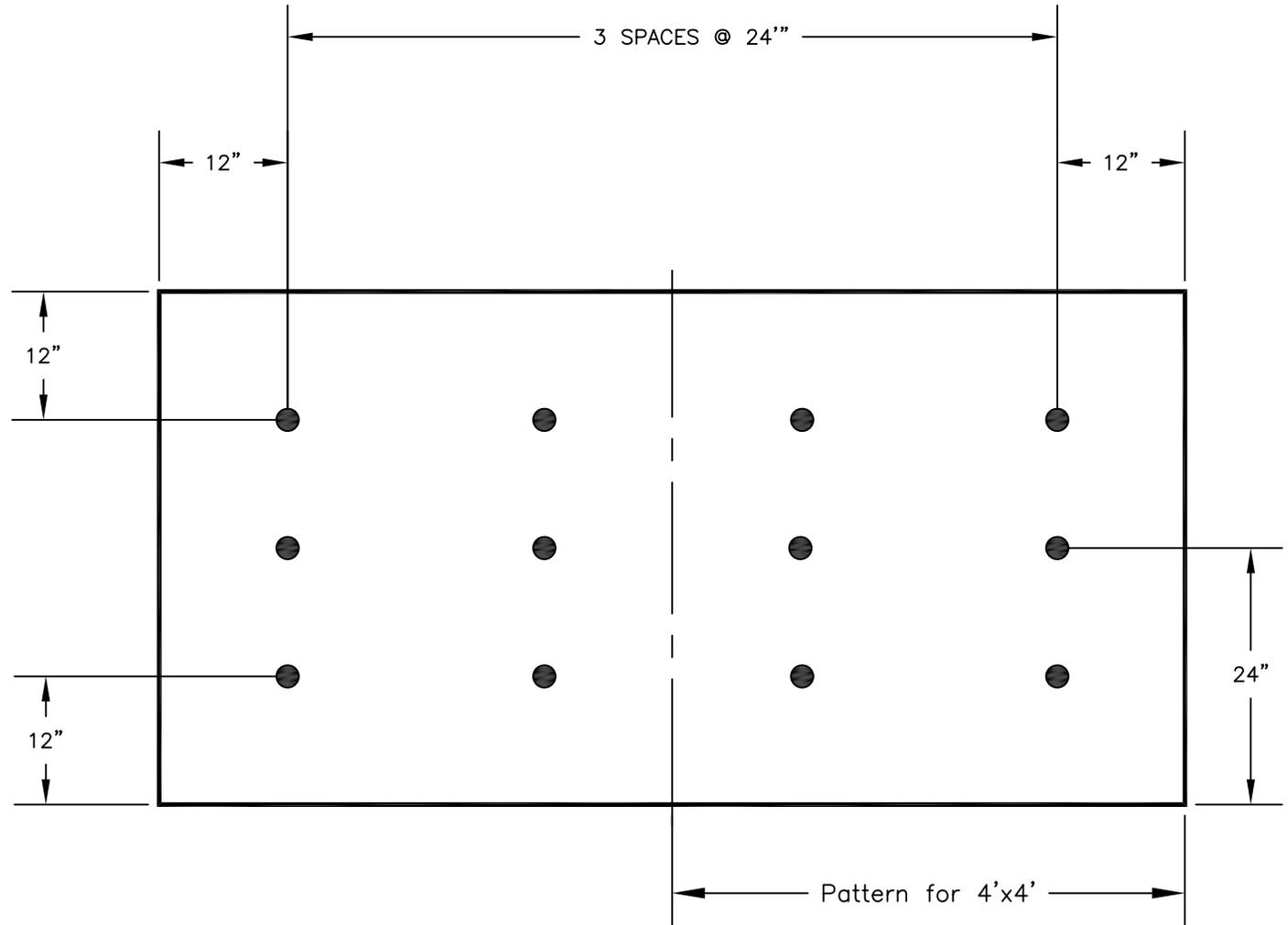
**DETAIL NO.:**

**INS-IW-20F-12H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2.67 SF (12 per 4x8)  
Fastened - 1 per 2.67 SF (6 per 4x4)**

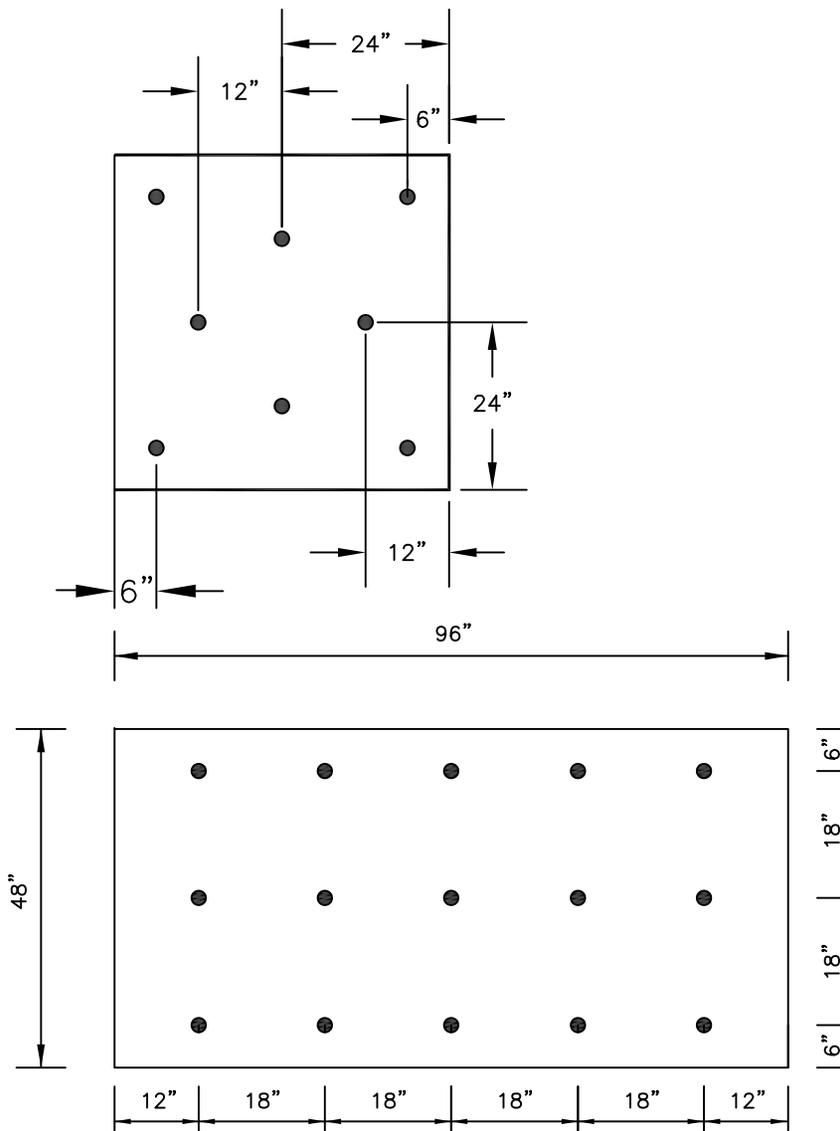
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:  
INS-UN-12F-6H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2.13 SF (15 per 4x8)  
Fastened - 1 per 2 SF (8 per 4x4)**

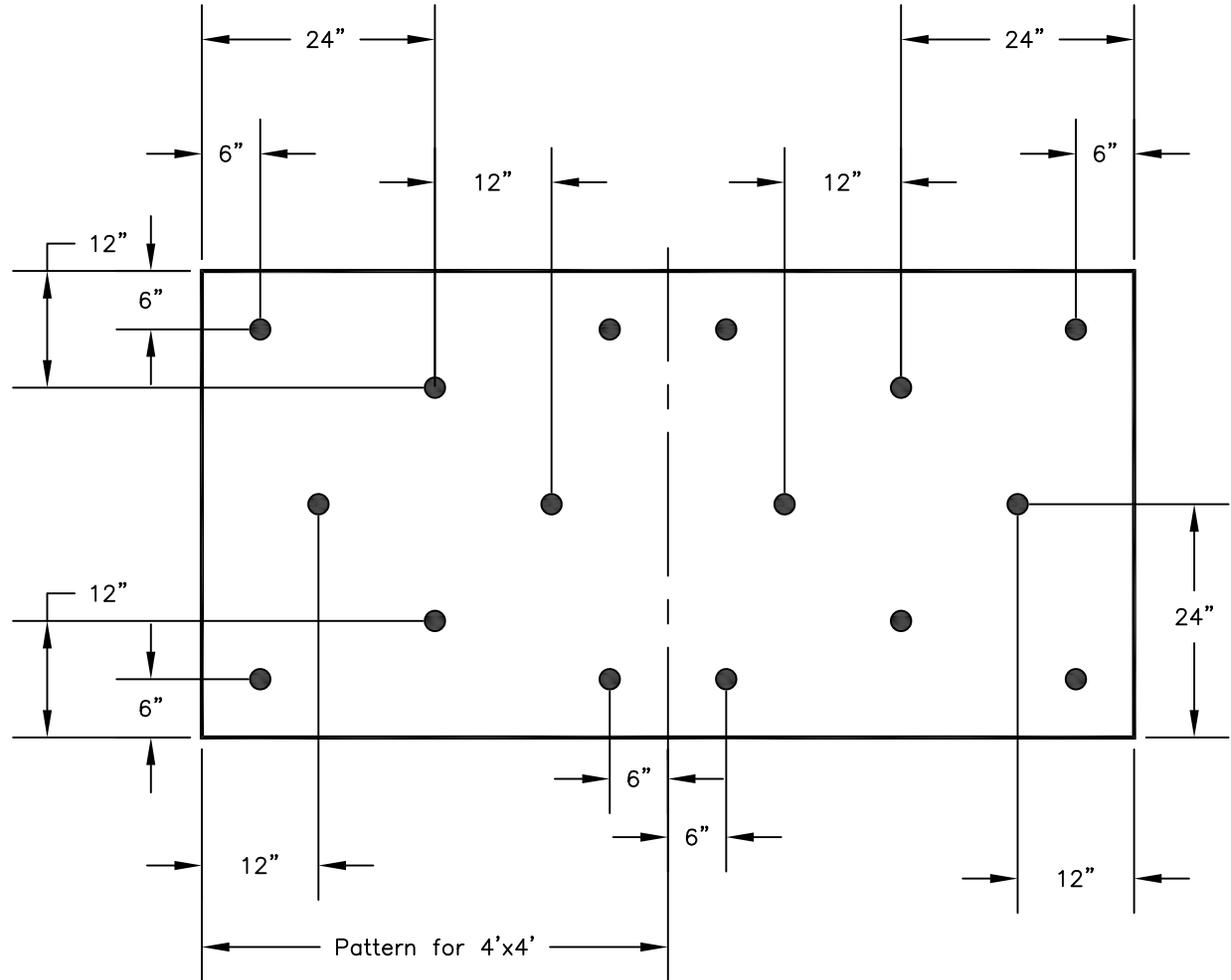
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:  
INS-UN-15F-8H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 2 SF (16 per 4x8)  
Fastened - 1 per 2 SF (8 per 4x4)**

**SYSTEMS:**

**FULLY ADHERED**

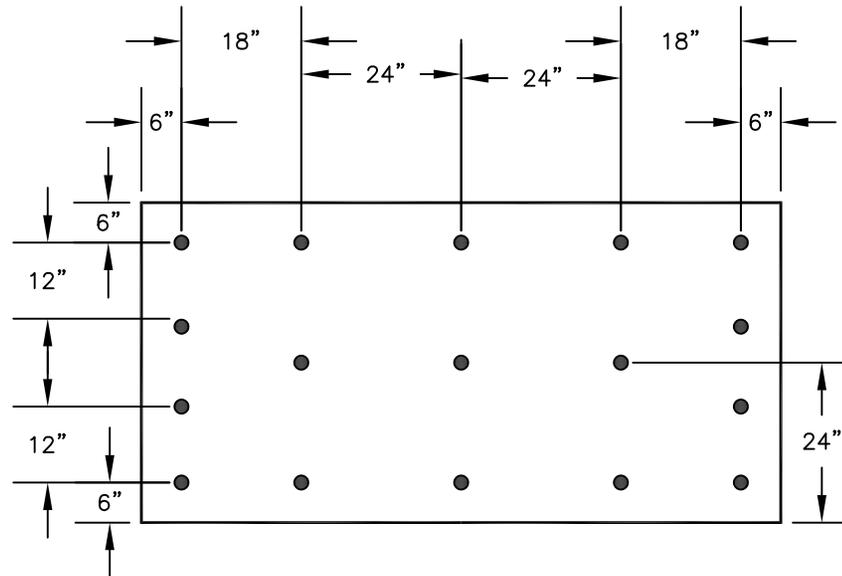
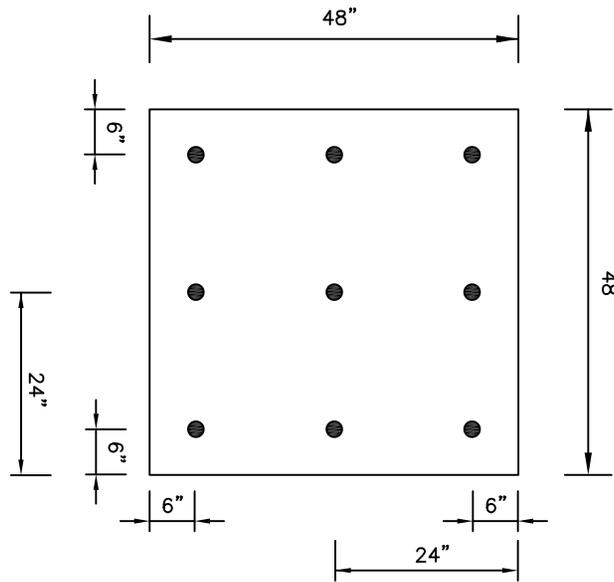
**DETAIL NO.:**

**INS-UN-16F-8H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.88 SF (17 per 4x8)  
Fastened - 1 per 1.77 SF (9 per 4x4)**

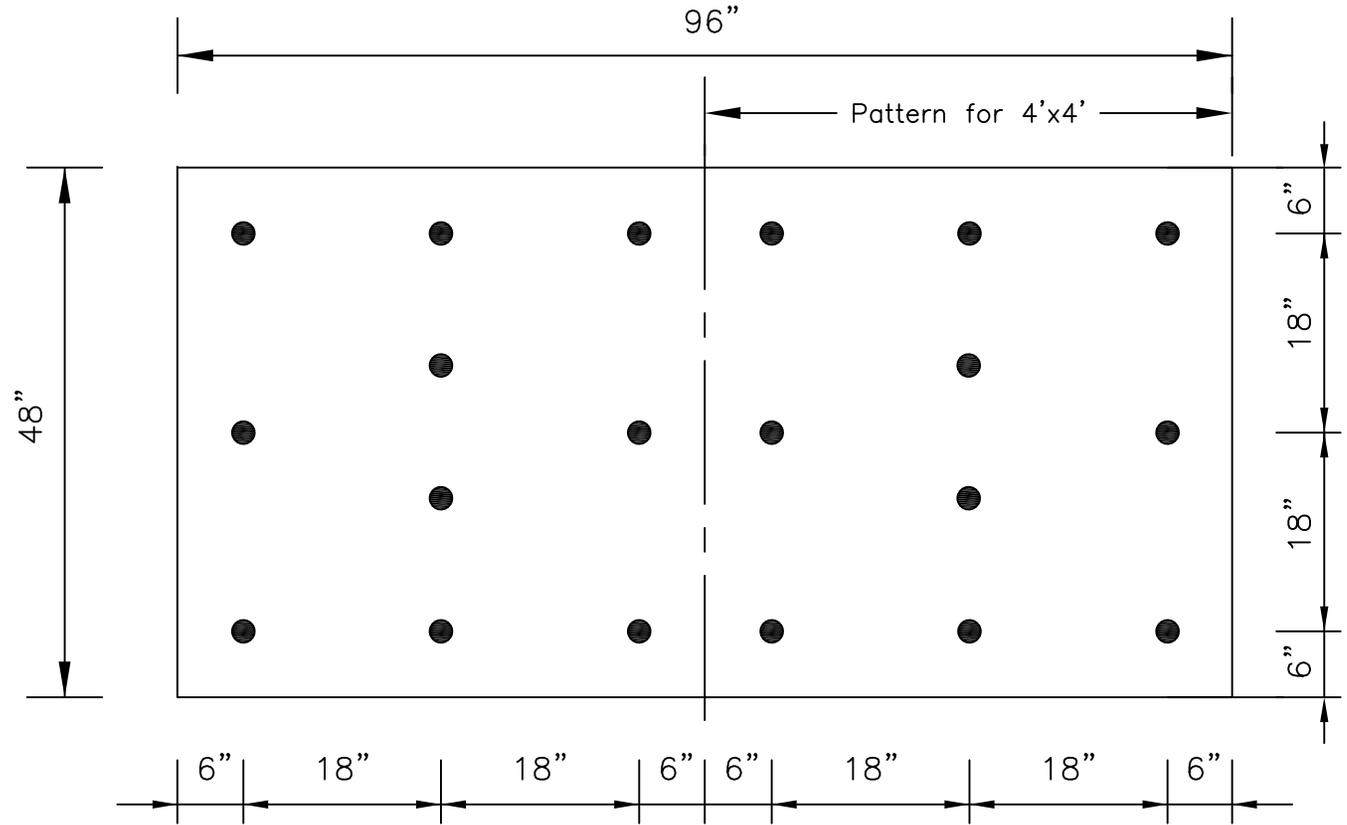
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:  
INS-UN-17F-9H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.6 SF (20 per 4x8)  
Fastened - 1 per 1.6 SF (10 per 4x4)**

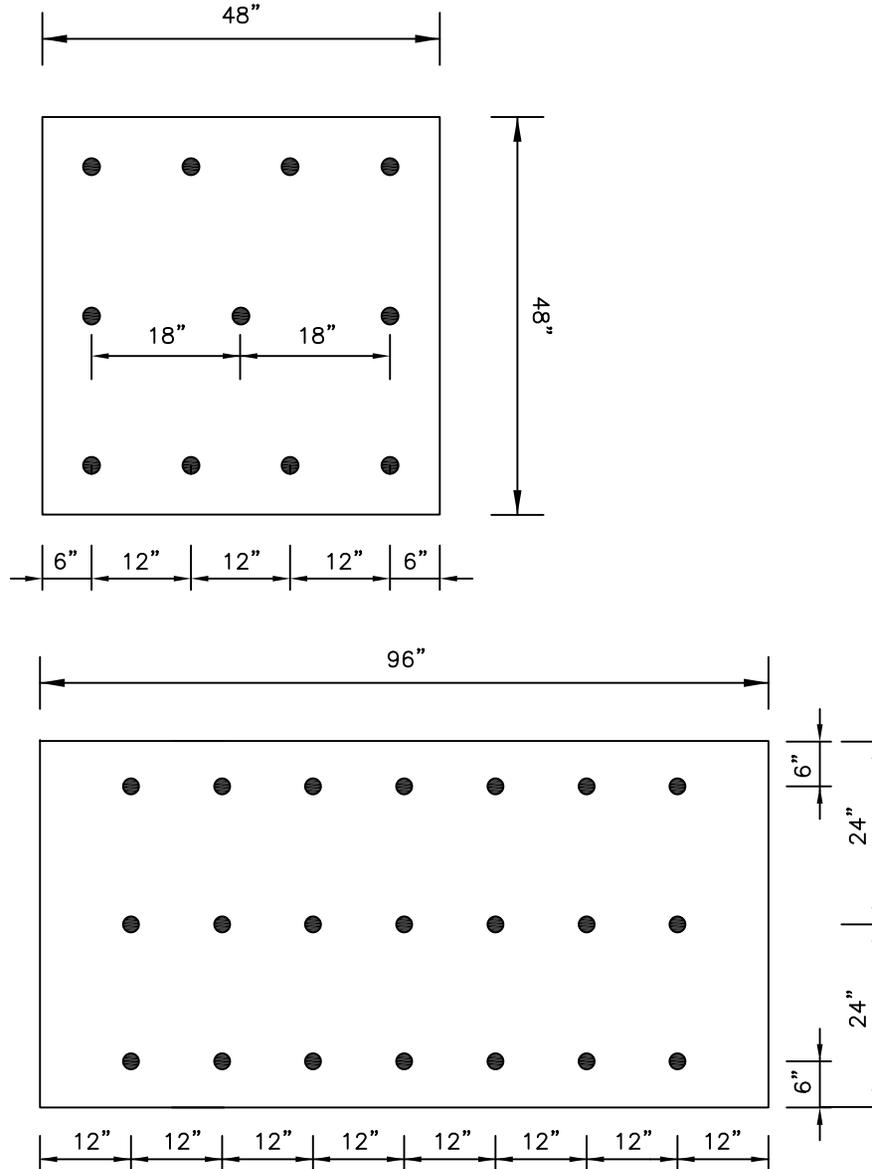
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:  
INS-UN-20F-10H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.52 SF (21 per 4x8)  
Fastened - 1 per 1.45 SF (11 per 4x4)**

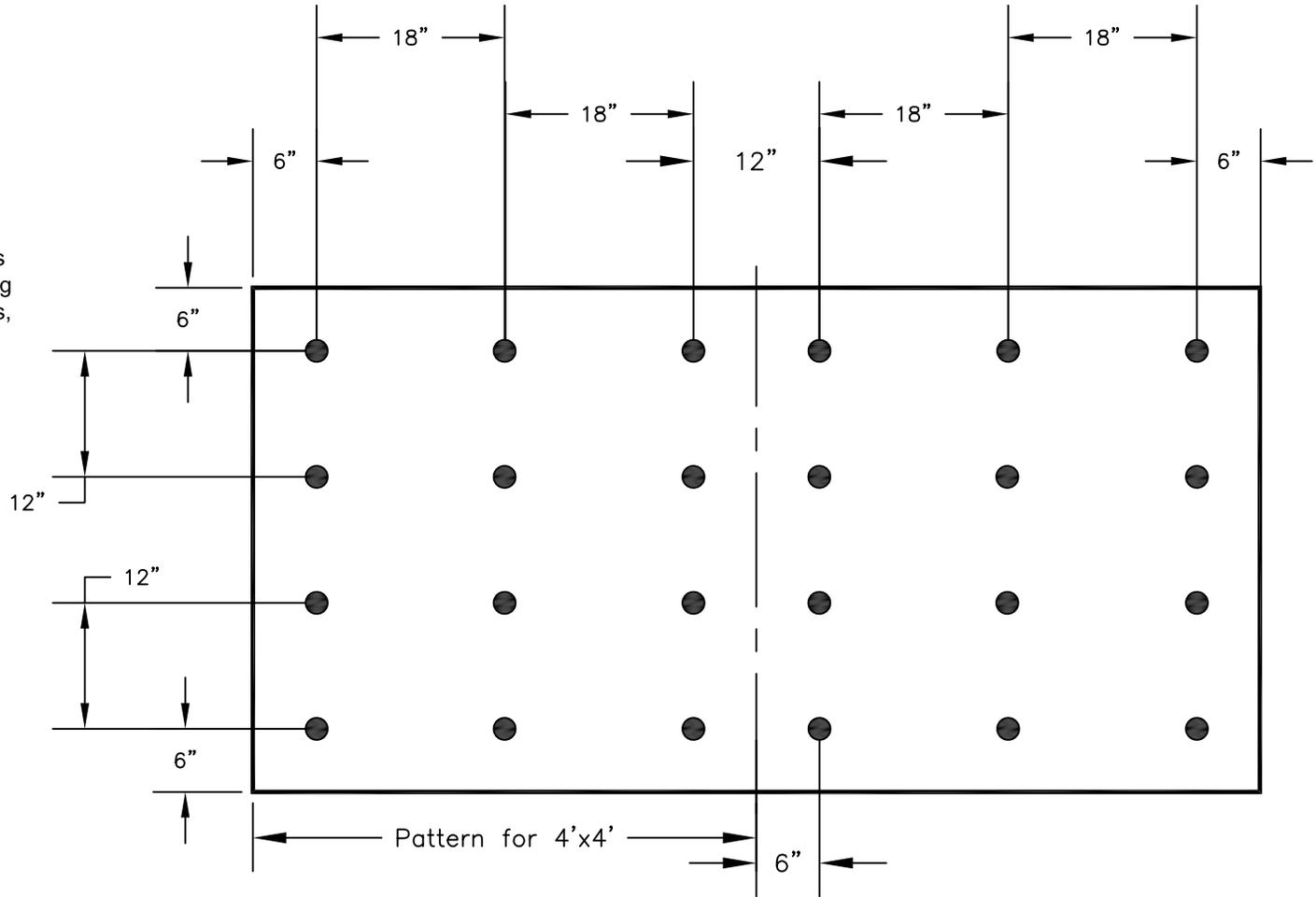
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:**  
**INS-UN-21F-11H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.33 SF (24 per 4x8)  
Fastened - 1 per 1.33 SF (12 per 4x4)**

**SYSTEMS:  
INDUCTION WELDED  
FULLY ADHERED**

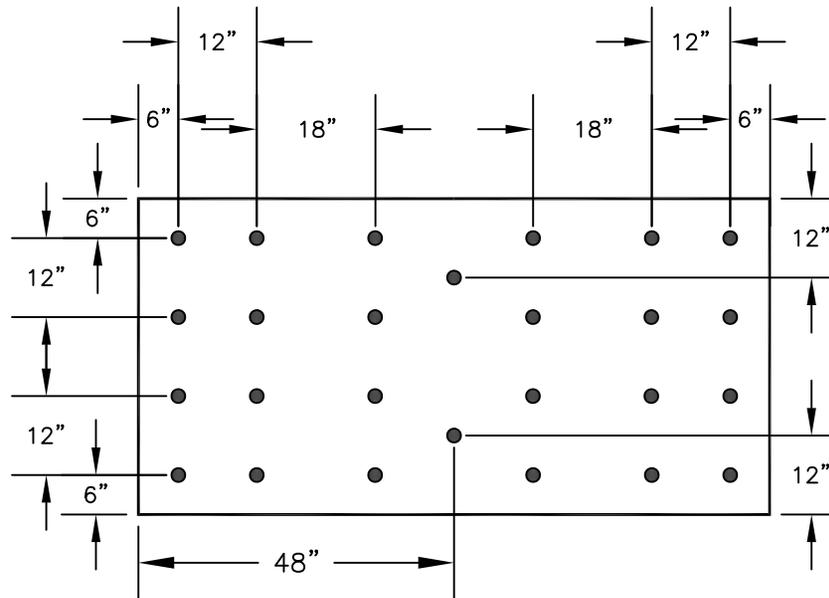
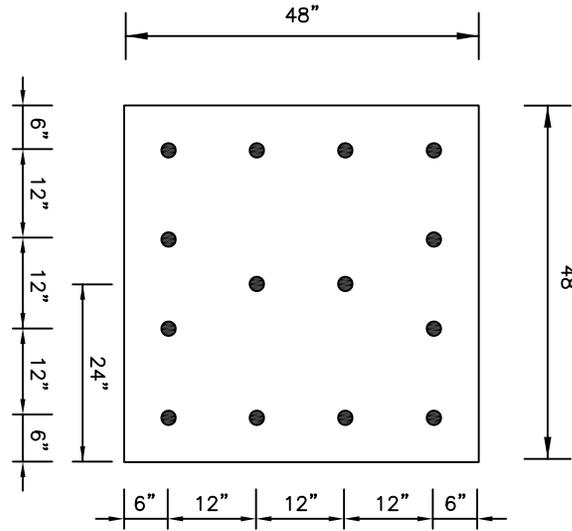
**DETAIL NO.:**

**INS-UN-24F-12H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.23 SF (26 per 4x8)  
Fastened - 1 per 1.14 SF (14 per 4x4)**

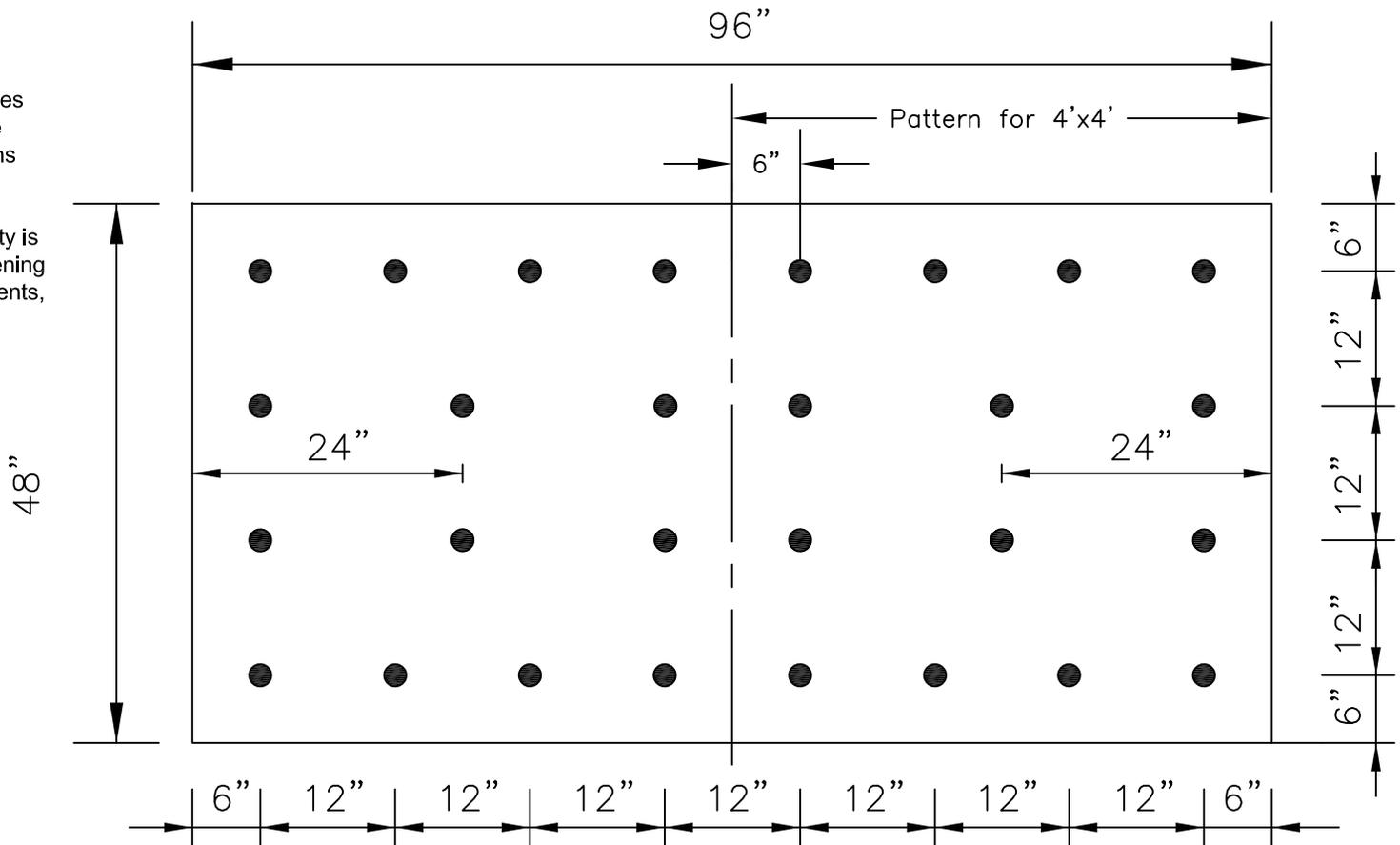
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:**  
**INS-UN-26F-14H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



\* It is the responsibility of the owner and/or architect to design the roof and select the roofing system. Mule-Hide is not responsible, under any circumstance or theory for the design and construction of any building. It is the roofing contractor's sole responsibility to determine and ensure that the roofing system selected complies with all local codes and requirements

**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.14 SF (28 per 4x8)  
Fastened - 1 per 1.14 SF (14 per 4x4)**

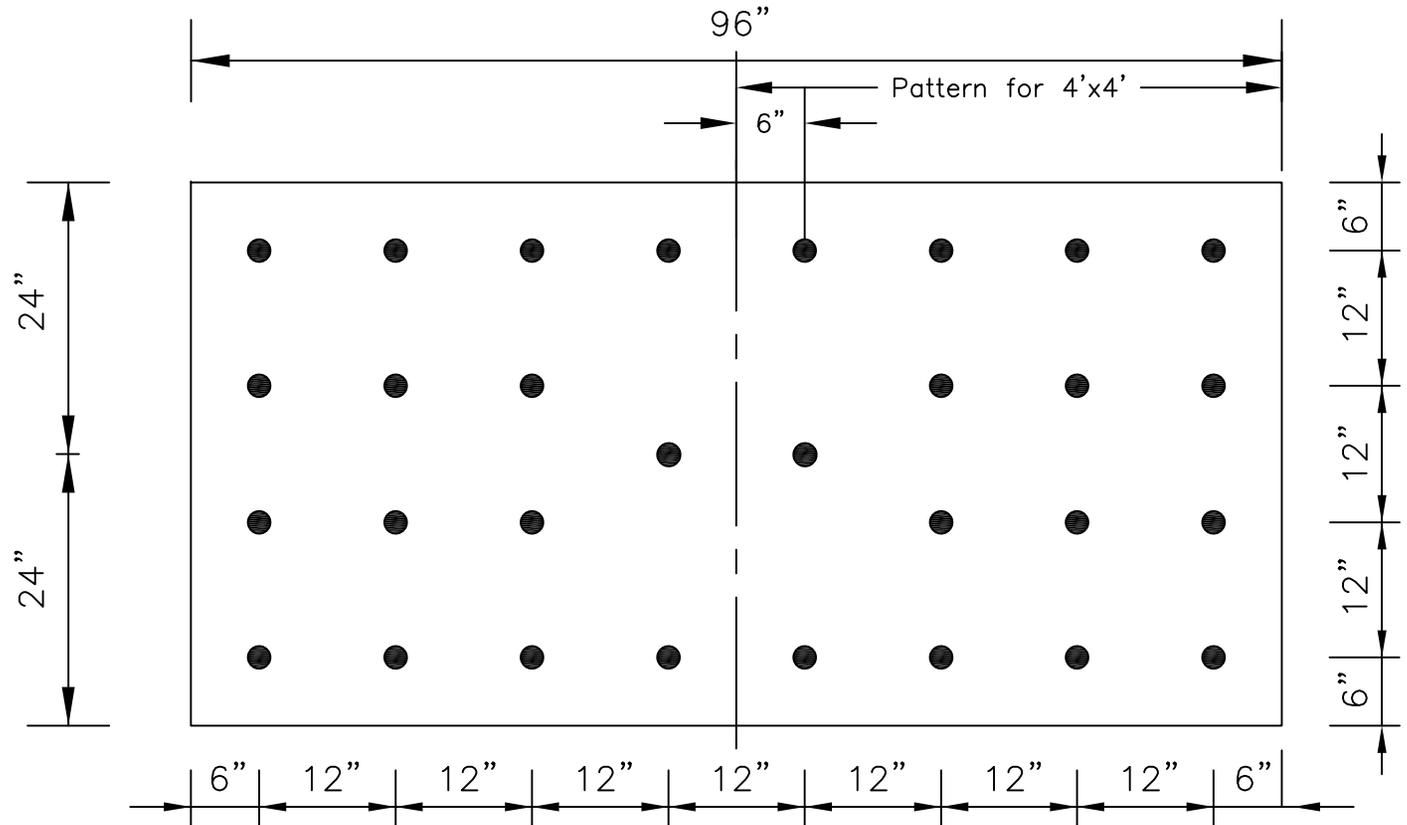
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:**  
**INS-UN-28F-14H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1.06 SF (30 per 4x8)  
Fastened - 1 per 1.06 SF (15 per 4x4)**

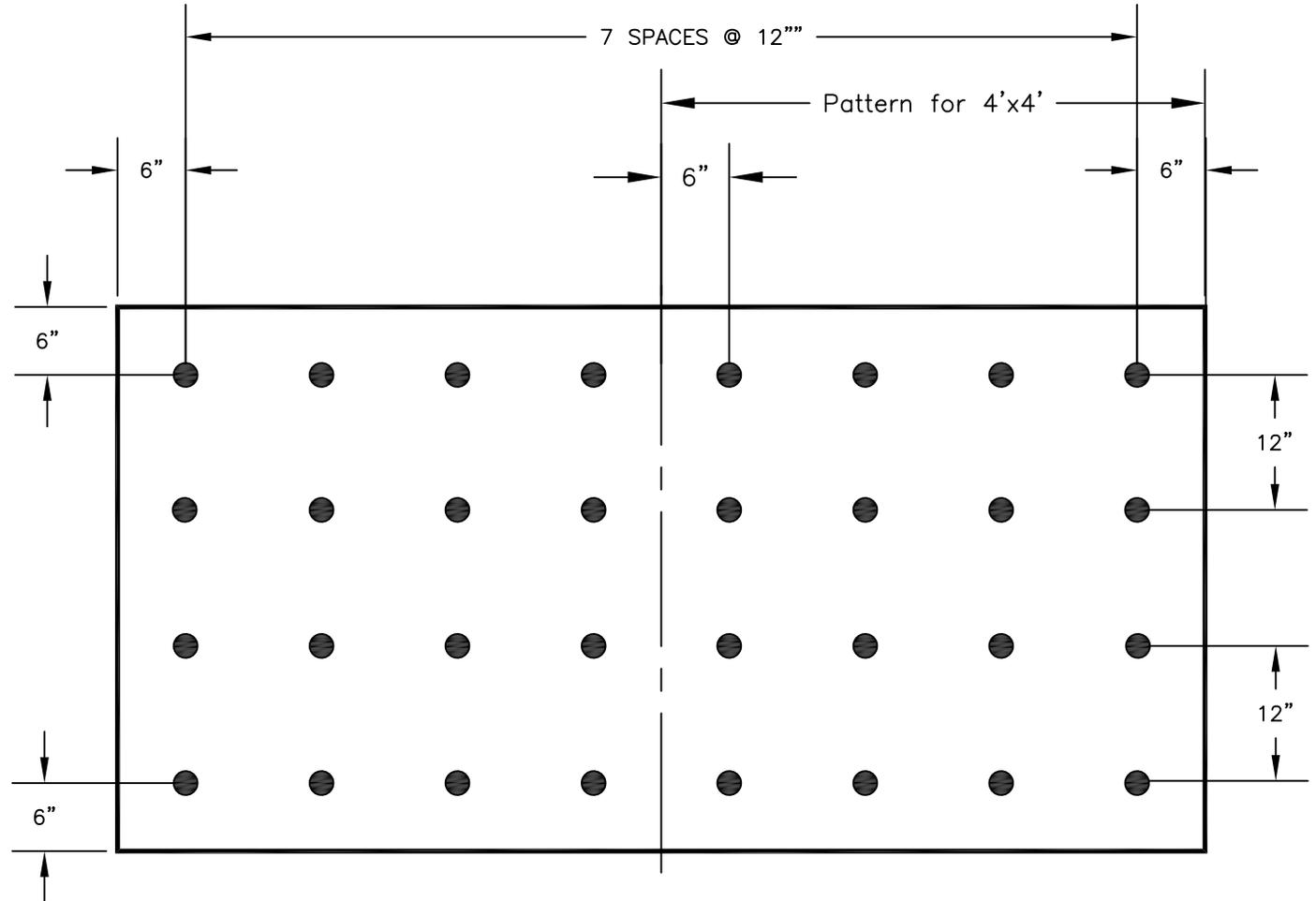
**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:**  
**INS-UN-30F-15H**

REVISION DATE: 6/24/2024

NOTES:

1. Various design criteria will determine minimum fastening rate. Reference the Technical Guide "Single-ply Insulation Attachment Guidelines" document for minimum quantity of fasteners per board.
2. Factory Mutual Insulation attachment rates and patterns may differ from Mule-Hide Products. Refer to FM recommendations on FM insured projects.
3. If a Mule-Hide Products system warranty is sought and requires an enhanced fastening rate beyond Factory Mutual's requirements, then the Mule-Hide requirements supercede the FM requirements.



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**MULE-HIDE  
PRODUCTS CO., INC.**

**Fastened - 1 per 1 SF (32 per 4x8)  
Fastened - 1 per 1 SF (16 per 4x4)**

**SYSTEMS:  
FULLY ADHERED**

**DETAIL NO.:  
INS-UN-32F-16H**

REVISION DATE: 6/24/2024