



TP SPECIFICATION
ATTACHMENT
 TPO/PVC ROOFING SYSTEMS

**Thermoplastic Mechanically Fastened Roofing Systems
 Induction Welding (RhinoBond / Isoweld) Attachment Method**

“Attachment I”

January 2017

This is an alternate method for securing the Carlisle’s Sure-Weld (TPO) or Sure-Flex (PVC) membrane and is intended to be used in conjunction with the Carlisle’s Thermoplastic Mechanically Fastened Specification and Details.

A. Description

The Induction Welding (RhinoBond/Isoweld) Attachment Method incorporates 3" diameter corrosion-resistant plates with a hot melt TPO or PVC coating. The RhinoBond or Isoweld Plates are installed with HP-X Fasteners to secure an acceptable insulation to minimum 22 gauge steel deck or minimum 15/32" thick plywood.

Carlisle’s Polyester Reinforced Thermoplastic membrane is positioned over the secured RhinoBond or Isoweld plates and welded to the top surface of the plate with the RhinoBond or Isoweld Induction Welding Tool.

Induction Welding (RhinoBond/Isoweld) Attachment Method Limited to 20 Year Maximum Warranty and Wind Speed Coverage Up to 90 mph. Perimeter enhancements will be required on systems greater than 72 mph. Contact Carlisle for requirements for enhancements.

Table I Induction Welded - Membrane Systems Warranty Options

Years	Thermoplastic Membranes (Sure-Weld TPO)		
	Warranty Wind Speed	Minimum Membrane Thickness (1)	Additional Puncture Coverage
	55, 72, 80 or 90 mph		
5,10, or 15 year	√(2)	Sure-Weld 45-mil	Not Available
20 year	√(2)	Sure-Weld 60-mil	Not Available

Notes: √= Acceptable

- (1) All “T-Joints” must be overlaid with appropriate flashing material when using 60-mil membrane.
- (2) Perimeter enhancements required for wind speed coverage greater than 72mph. Contact Carlisle for requirements.

B. Products/Heat Welding Equipment

Products listed in "Part II" of the Carlisle Thermoplastic Mechanically Fastened Roofing System Specification can be used as part of this alternate securement method in conjunction with the RhinoBond or Isoweld Welding Plates.

1. **RhinoBond or Isoweld TPO or PVC Welding Plate:** A 3" diameter, 0.028" thick, corrosion-resistant steel plate with hot melt coating on the top surface. The plate is used in conjunction with Carlisle's HP-X Fasteners to attach the roofing assembly and is activated using the RhinoBond or Isoweld Induction Welding Tool.
2. **RhinoBond or Isoweld Induction Welding Tool:** An induction heating tool is used to emit the magnetic field that activates the hot melt coating on the top surface of the RhinoBond or Isoweld Welding Plate to fuse with the roofing membrane. Refer to RhinoBond or Isoweld Owner's Manual for additional information.
3. **Magnet:** A stand-up device that allows the weld to cool as it holds the membrane to the heated plate. Refer to RhinoBond or Isoweld Owner's Manual for additional information.

C. RhinoBond Induction Tool Calibration

Prior to proceeding with membrane attachment to the plate, the RhinoBond Induction Welding Tool must be calibrated with samples of the project specified insulation thickness and type and project specified membrane thickness. Refer to RhinoBond Owner's Manual for additional information.

1. Loose lay five RhinoBond Plates in a row about 12-24" apart on the specified membrane substrate.
2. Place membrane over the RhinoBond Plates.
3. Centering over the RhinoBond Plate under the membrane, place the Induction Welding Tool and use the device's default setting. Weld the membrane to the first plate, and when ready, completely remove Welding Tool. Immediately place the Magnet on the membrane over the plate and leave in place for 60 seconds.
4. Place Induction Welding Tool on the next plate as previously done and increasing induction energy one level by depressing the "up" button once. After welding, immediately place the Magnet.
5. Repeat above procedure for the remainder of the plates, increasing induction energy one level for each plate.
6. After allowing the membrane and plates to cool to ambient temperature, remove Cooling Clamp and use a pliers by apply force to peel RhinoBond Plate from underside of membrane to determine bonding strength. Desired result is welded ply of membrane stays fused to RhinoBond Plate.
7. Repeat trial process, if needed, adjusting energy level up or down until desired results are achieved.

Note: Recalibrate induction tool settings is necessary when ambient temperature changes more than +/- 15°F or power to device has been interrupted.

D. Isoweld Induction Tool Calibration

Calibrate the Isoweld induction welding tool using the process outlined in the Owner's Manual.

E. Installation

1. After placement of insulation on substrate, secure the insulation at a rate of six HP-X Fasteners and RhinoBond or Isoweld Plates per 4' x 8' board in the designated field and eight HP-X Fasteners and RhinoBond or Isoweld Plates around the perimeter. Refer to appropriate Carlisle detail for patterns and depth of perimeter area.

Note: Avoiding fastener overdrive to prevent plate from deforming.

2. Place Sure-Weld or Sure-Flex membrane over the appropriate RhinoBond or Isoweld Plates and allow membrane to relax.
3. Place RhinoBond Induction Tool over the RhinoBond TPO or PVC Welding Plate, under the roofing membrane OR Place the Isoweld Induction Tool over the Isoweld TPO or PVC Welding Plate, until the acoustic search mode signals the inductor is properly positioned.

4. Activate induction welding tool and leave in place until heating cycle is complete.
5. Immediately place Magnet on the membrane over the plate and leave in place for at least 60 seconds.
6. Resume process ensuring membrane is attached to all plates.

F. Membrane Hot Air Welding Procedures & Additional Securement

1. Adjoin membrane sheets by overlapping and heat welding the seam following standard Hot Air Welding Procedures as outlined in the “Part III” of the Thermoplastic Mechanically Fastened Roofing System Specification.
2. Base wall securement and securement around roof penetrations as well as flashings of walls and penetrations must comply with Carlisle requirements for the Thermoplastic Mechanically Fastened Roofing System.

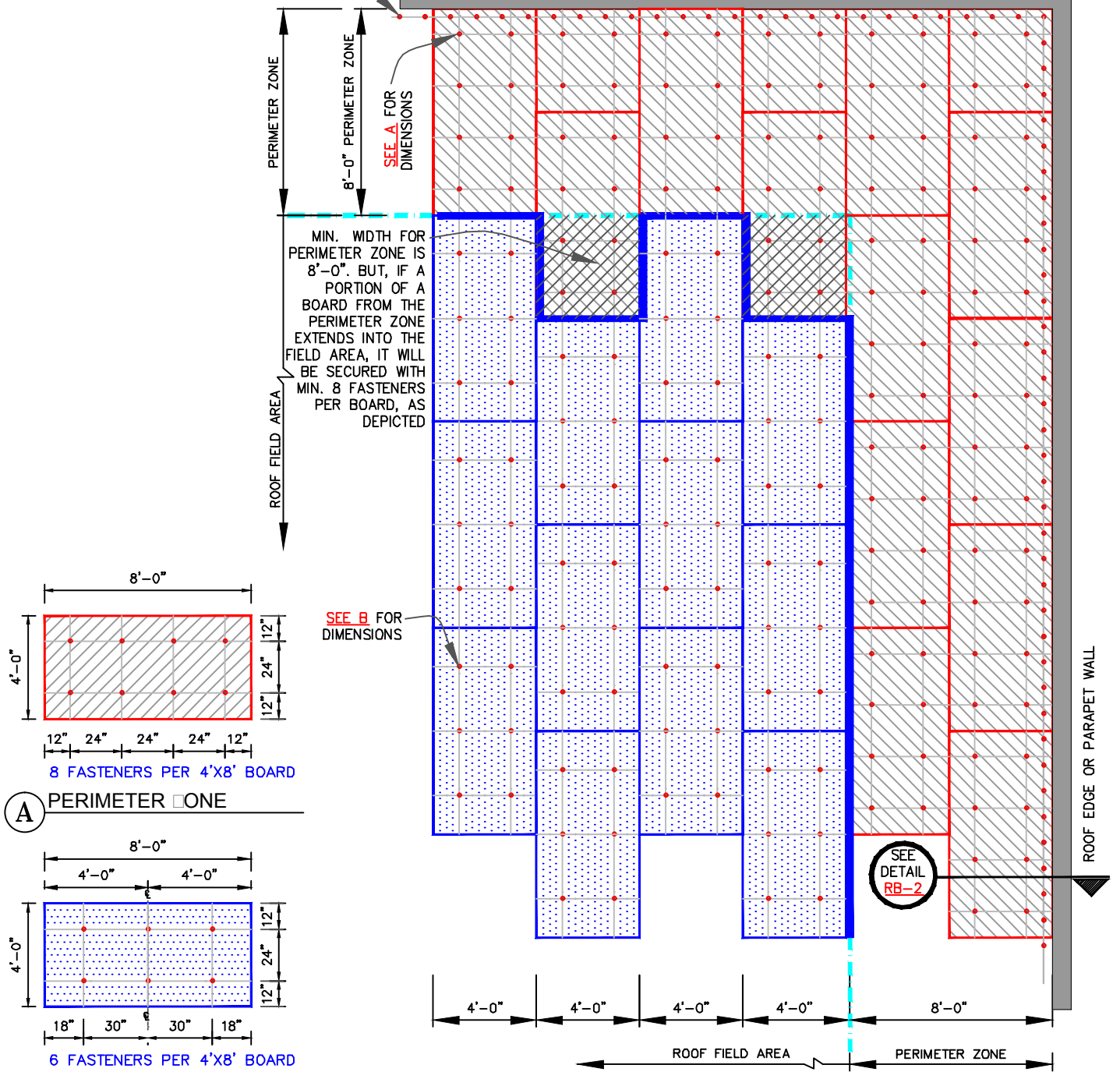
G. Associated Installation Details

RhinoBond Attachment Method – Number of Fasteners and Location	RB-1
Angle Change Securement Method with RhinoBond Plates	RB-2
RhinoBond Attachment Method – FM Fastening Patterns	RB-3
Isoweld Attachment Method – Number of Fasteners and Location	IW-1
Angle Change Securement Method with Isoweld Plates.....	IW-2
Isoweld Attachment Method – FM Fastening Patterns.....	IW-3

End of Section

12" (305mm) O.C. POSITIONED
3-1/2"-4" (89-102mm)
FROM ANGLE CHANGE

ROOF EDGE OR PARAPET WALL



LEGEND - ROOF PLAN

- CARLISLE SYNTEC FASTENER & RhinoBond FASTENING PLATE
- PERIMETER AREA
- ROOF FIELD AREA
- TRANSITION AREA

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE	CARLISLE HP-X FASTENER	3-1/8" (79.4mm) DIAMETER
PLYWOOD	15 / 32" (11.91mm)	CARLISLE HP-X FASTENER	3-1/8" (79.4mm) DIAMETER

NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.

THERMOPLASTIC MEMBRANE

APPROVED SUBSTRATE

SEE NOTE(S)

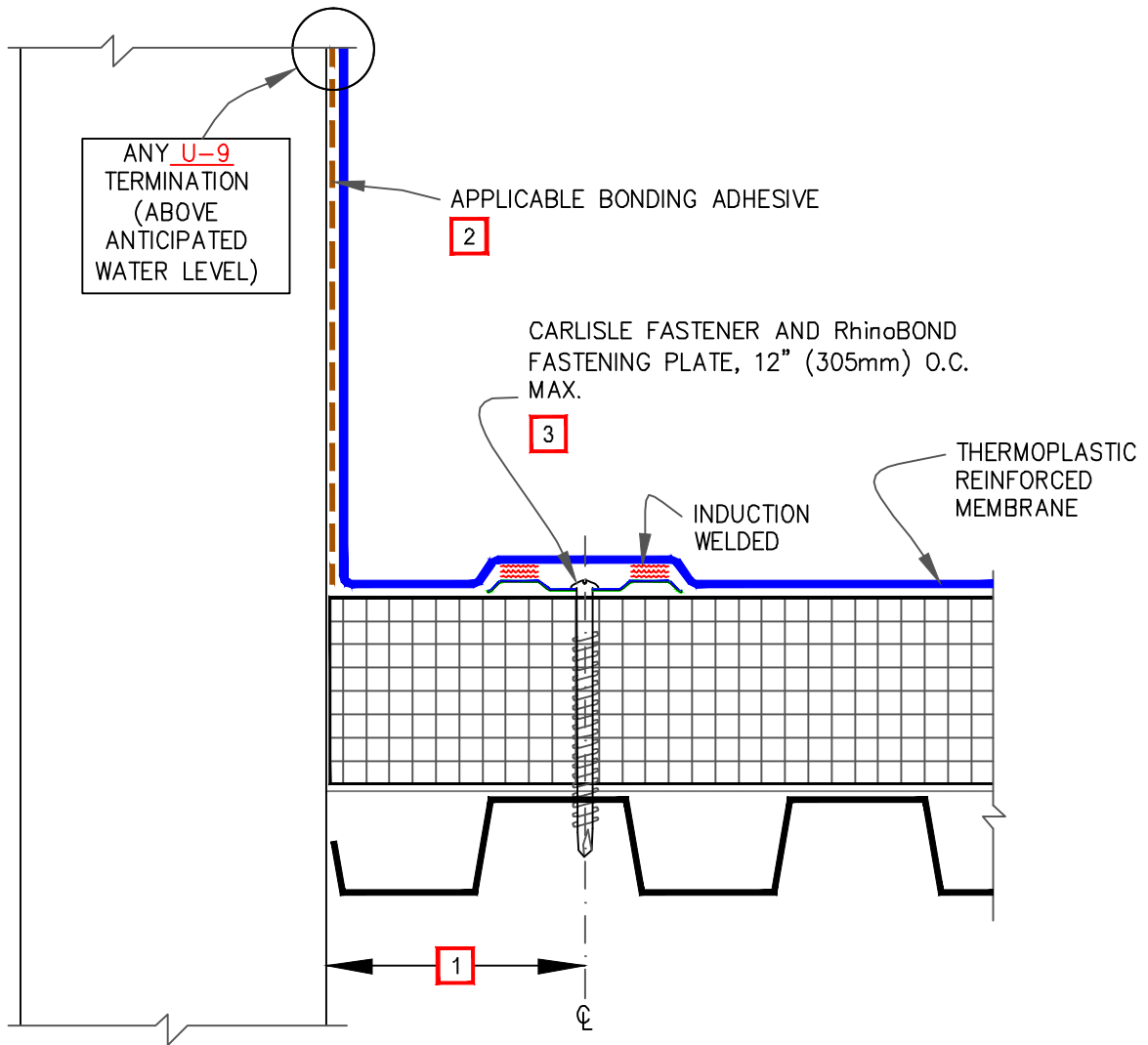
RhinoBond ATTACHMENT METHOD - NUMBER OF FASTENERS AND LOCATION

For additional information, refer to Specifications

DETAIL NO.


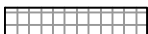


RB-1

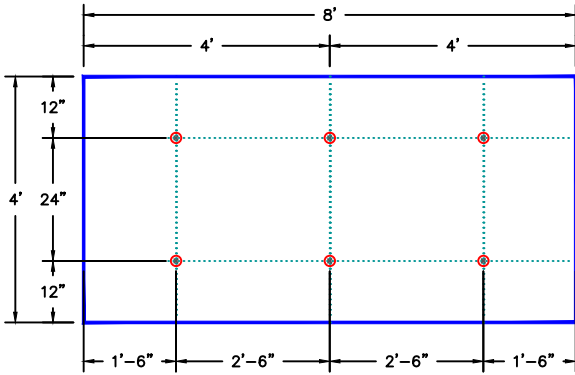
RhinoBond



NOTES:

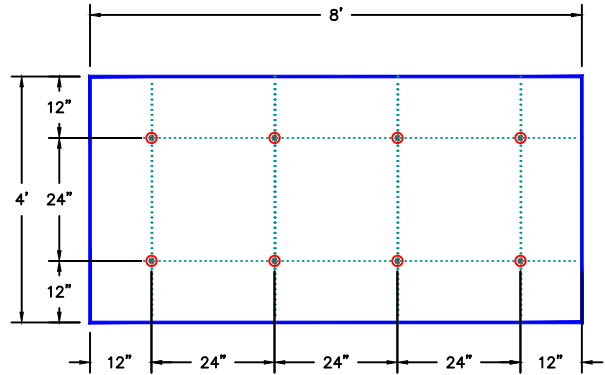
1. POSITION RhinoBOND PLATES 3-1/2" TO 4" (89 TO 102mm) FROM ANGLE CHANGE.
2. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.
3. HP-X FASTENERS AND RhinoBOND PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.
4. THIS METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS OR XPS INSULATION.

<p>  → THERMOPLASTIC MEMBRANE  → APPROVED SUBSTRATE  → SEE NOTE(S) </p>	<p align="center"> ANGLE CHANGE SECUREMENT METHOD WITH RhinoBond PLATES </p> <p>For additional information, refer to Specifications</p>	<p align="center">  </p> <p align="center"> DETAIL NO. RB-2 RhinoBond </p>
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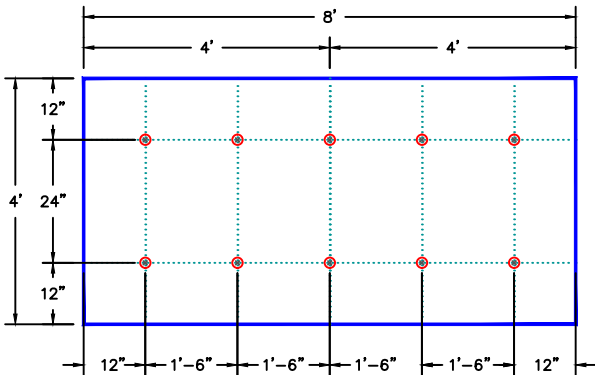
6 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (FIELD)



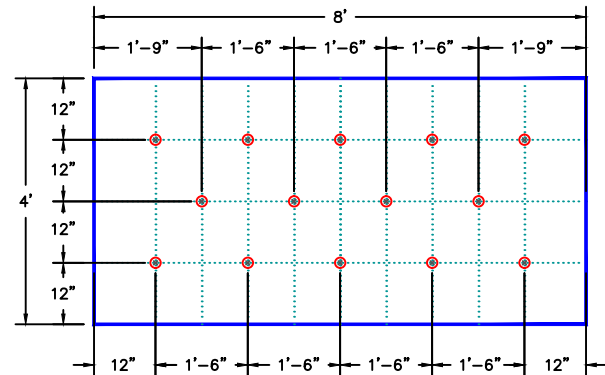
8 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-105 (FIELD) GRADE 'C' STEEL DECKS
FM 1-120 (FIELD) GRADE 'E' STEEL DECKS



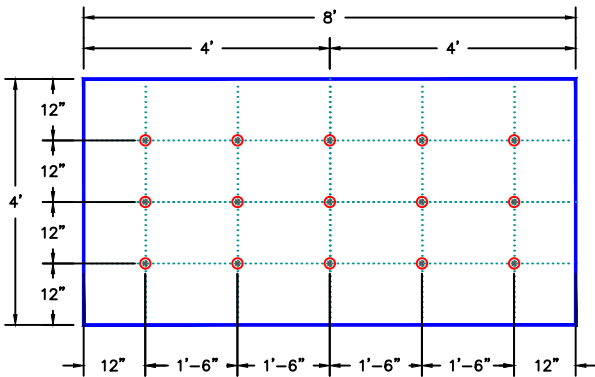
10 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (PERIMETER) ENHANCEMENT PATTERN



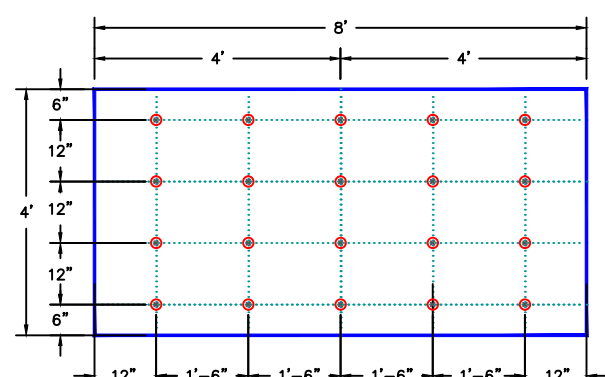
14 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-105 (PERIMETER) ENHANCEMENT GRADE 'C' STEEL DECKS
FM 1-120 (PERIMETER) ENHANCEMENT GRADE 'E' STEEL DECKS



15 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (CORNER) ENHANCEMENT PATTERN



20 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-105 (CORNER) ENHANCEMENT GRADE 'C' STEEL DECKS
FM 1-120 (CORNER) ENHANCEMENT GRADE 'E' STEEL DECK

→ THERMOPLASTIC MEMBRANE
 → APPROVED SUBSTRATE
0 → SEE NOTE(S)

RhinoBond ATTACHMENT METHOD - FM FASTENING PATTERNS

For additional information, refer to Specifications



DETAIL NO.

RB-3

RhinoBond

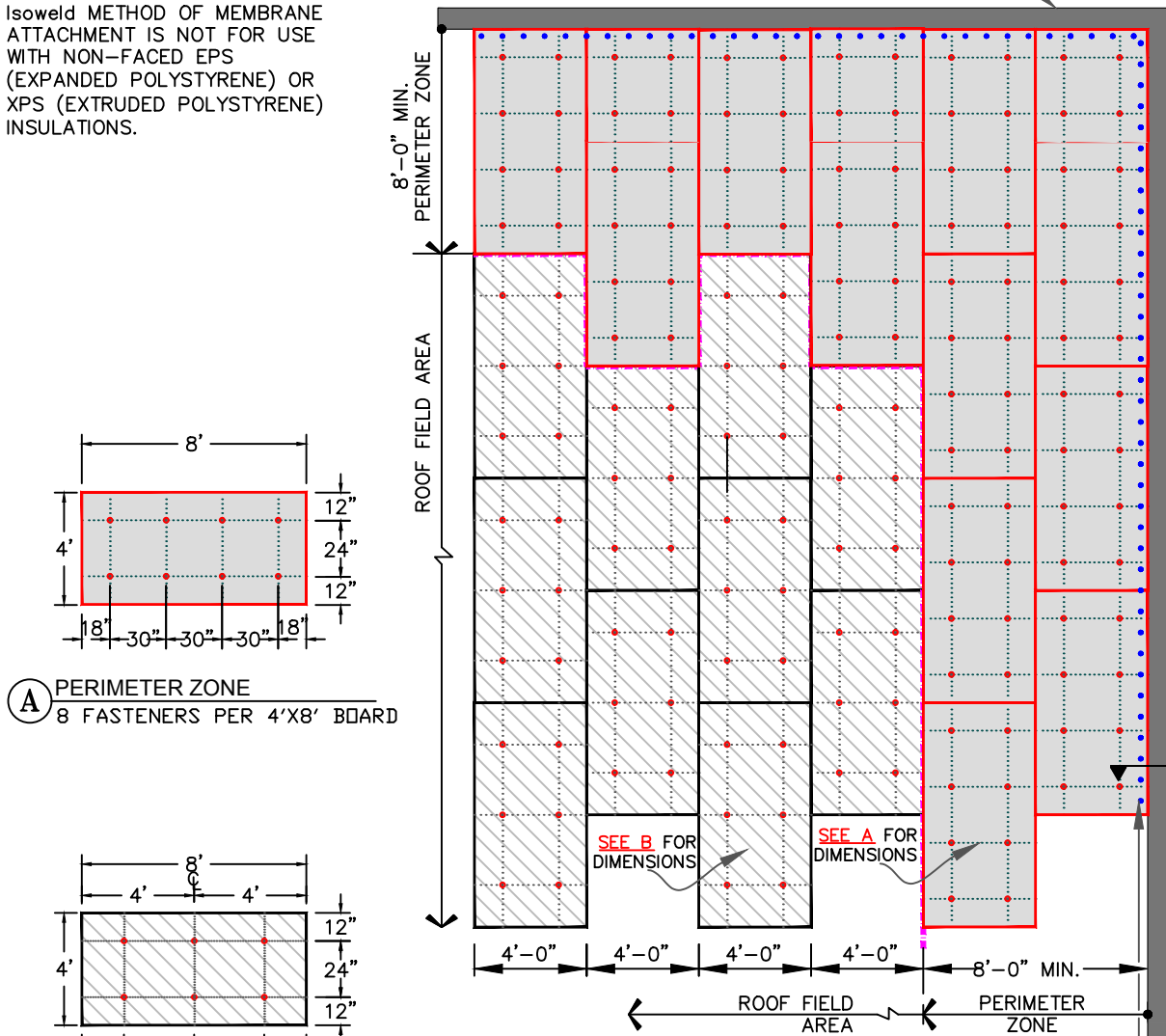
THERMOPLASTIC MEMBRANES

Isoweld

NOTE:

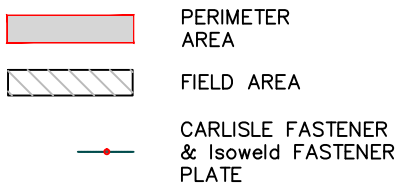
Isoweld METHOD OF MEMBRANE ATTACHMENT IS NOT FOR USE WITH NON-FACED EPS (EXPANDED POLYSTYRENE) OR XPS (EXTRUDED POLYSTYRENE) INSULATIONS.

RAISED ROOF EDGE OR PARAPET WALL



(A) PERIMETER ZONE
8 FASTENERS PER 4'X8' BOARD

(B) FIELD OF ROOF
6 FASTENERS PER 4'X8' BOARD



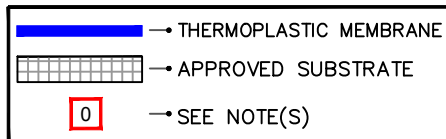
MEMBRANE FASTENED MINIMUM 12" O.C. AT ANGLE(S) CHANGES. FOR ADDITIONAL INFORMATION SEE DETAIL [IW-2](#)

DECK TYPE	DECK THICKNESS	FASTENER	THERMOPLASTIC COATED PLATE
STEEL	22 GAUGE (0.8mm)	CARLISLE HP-X FASTENER	3-1/8" (79.4mm) DIAMETER
PLYWOOD	15/32" (12mm)		

NOTE: AT IN-FILL MINOR PIECES, USE MIN. 2 FASTENERS.

INCHES TO MILLIMETERS							
inch	2"	3.5"	4"	12"	18"	24"	30"
mm	51	89	102	305	457	610	762

FEET TO MILLIMETERS			
FEET	1'	4'	8'
mm	305	1219	2438



Isoweld ATTACHMENT METHOD - NUMBER OF FASTENERS AND LOCATIONS

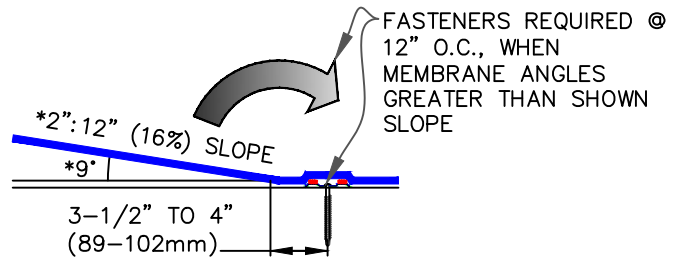
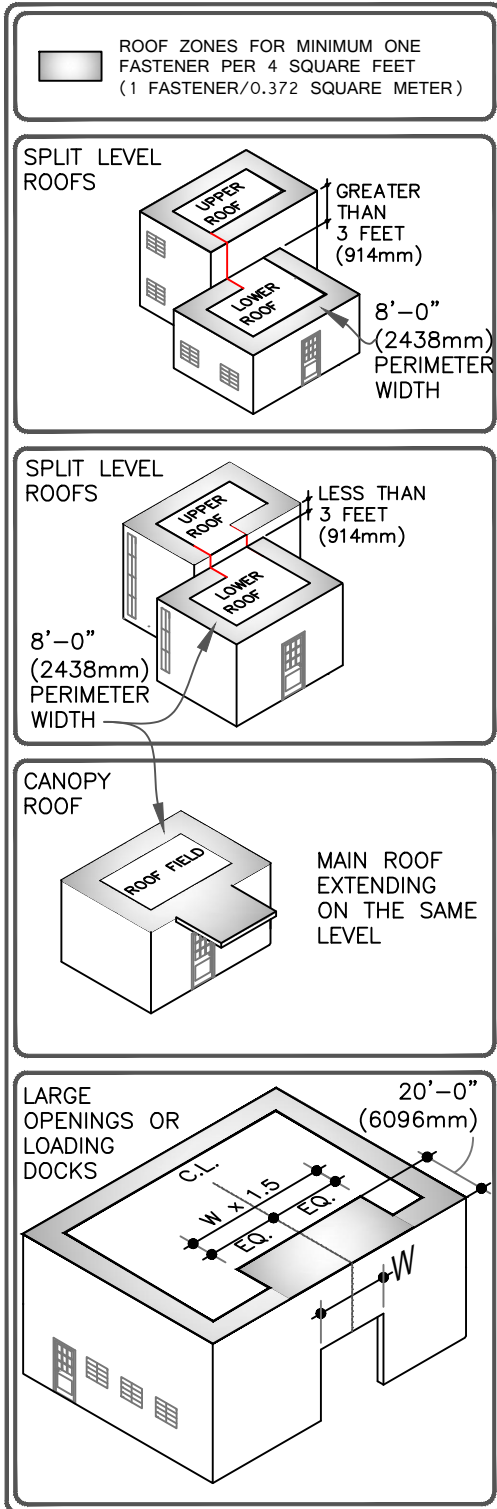
For additional information, refer to Specifications



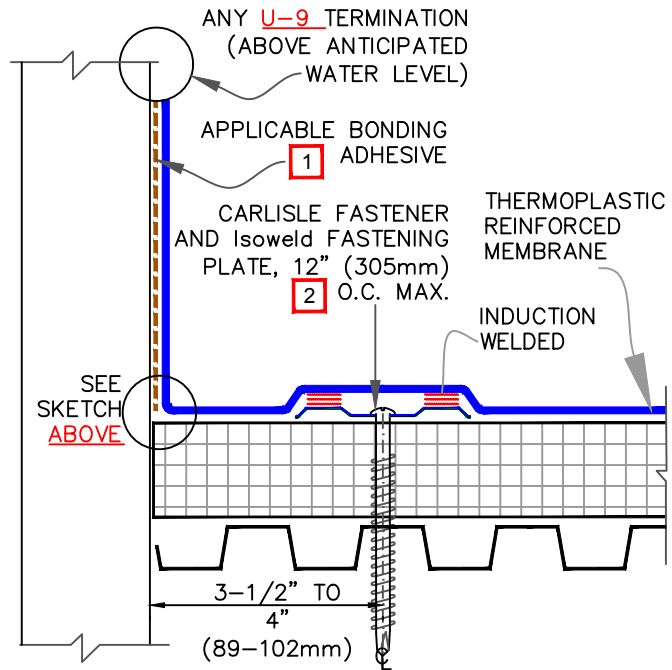
DETAIL NO.

IW-1

Isoweld



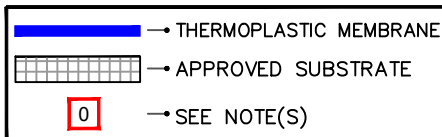
*100mm HORIZONTAL:16mm VERTICAL



ANGLE CHANGE SECUREMENT

NOTES:

1. SURE-WELD MEMBRANE REQUIRES SURE-WELD BONDING ADHESIVE AND SURE-FLEX MEMBRANE REQUIRES SURE-FLEX BONDING ADHESIVE.
2. HP-X FASTENERS AND Isoweld PLATES ARE REQUIRED OVER STEEL AND WOOD DECKS.



ANGLE CHANGE SECUREMENT METHOD WITH Isoweld PLATES

For additional information, refer to Specifications

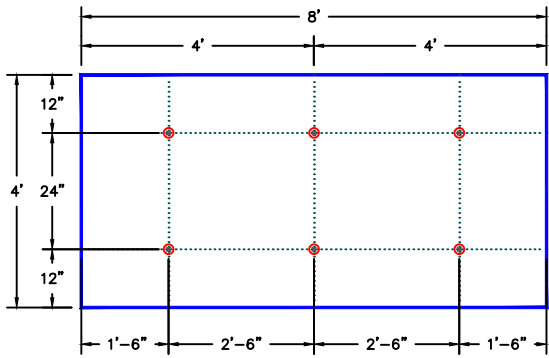


DETAIL NO.

IW-2

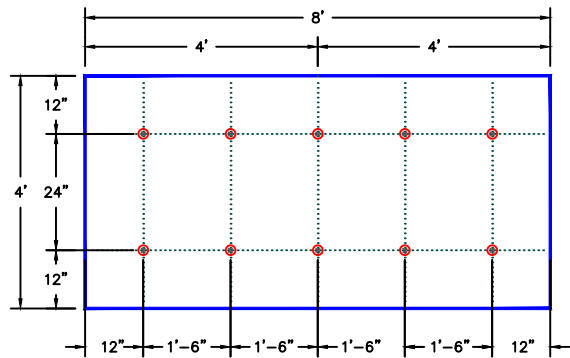
Isoweld

THERMOPLASTIC MEMBRANES **Isoweld**



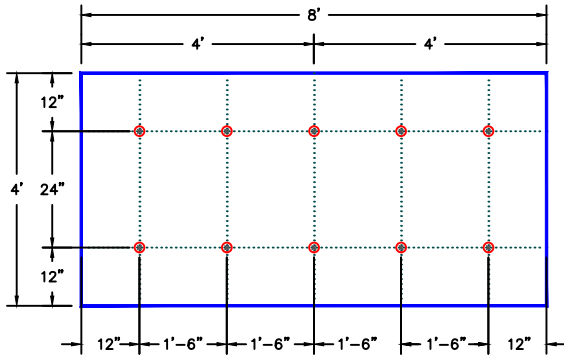
6 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (FIELD)



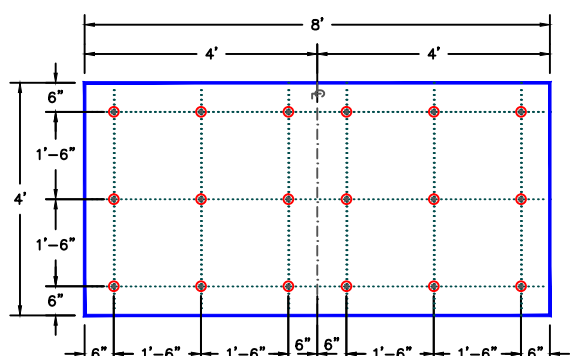
10 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-150 (FIELD)



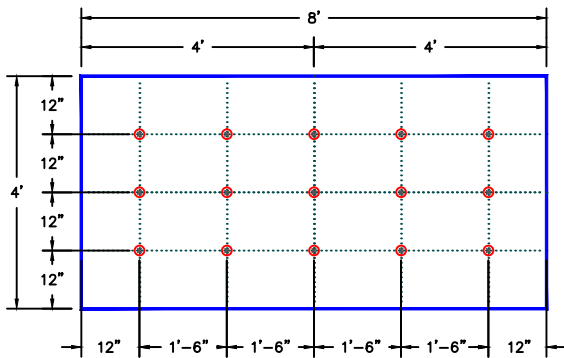
10 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (PERIMETER) ENHANCEMENT PATTERN



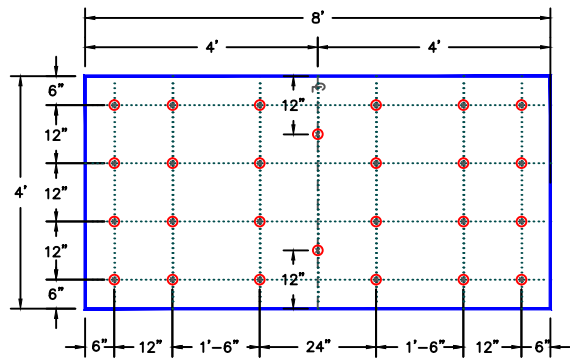
18 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-150 (PERIMETER) ENHANCEMENT PATTERN



15 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-90 (CORNER) ENHANCEMENT PATTERN



26 FASTENERS PER 4'-0" X 8'-0" BOARD

FM 1-150 (CORNER) ENHANCEMENT PATTERN

<p>→ THERMOPLASTIC MEMBRANE</p> <p>→ APPROVED SUBSTRATE</p> <p>0 → SEE NOTE(S)</p>	<p>Isoweld ATTACHMENT METHOD - FM FASTENING PATTERNS</p> <p>For additional information, refer to Specifications</p>	<p>DETAIL NO.</p> <p>IW-3</p> <p>Isoweld</p>
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