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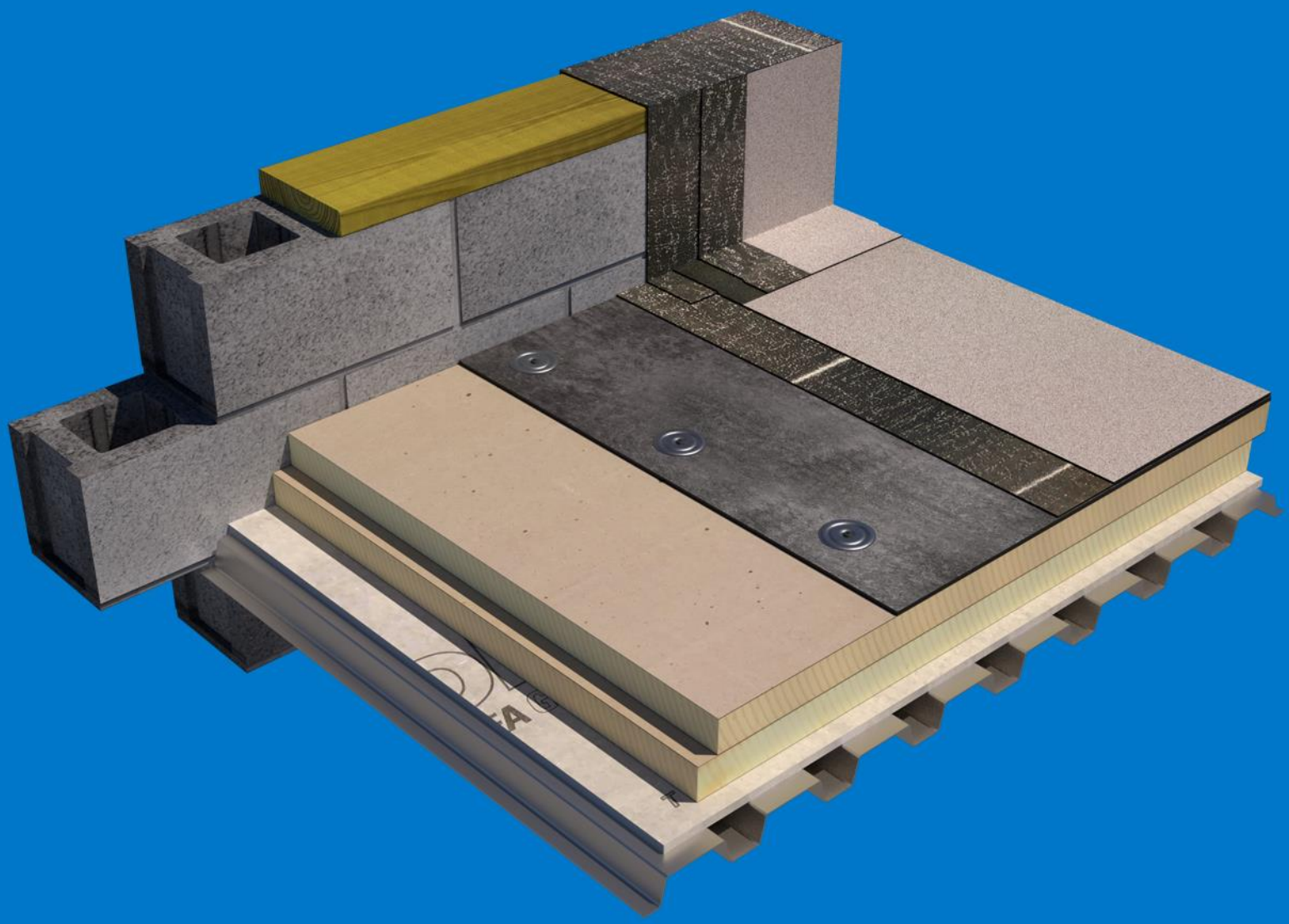
SOPREMA®

LOW-SLOPE ROOFING INSULATION TECHNICAL MANUAL



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INTRODUCTION

SOPREMA® roof insulation products and accessories are manufactured to meet insulation product requirements for use with low-slope roofing membrane assemblies. Rigid insulation, cover-boards, thermal barriers and the related insulation accessories are tested as individual components and/or tested within SOPREMA® low-slope roofing assemblies. *Tested/approved* roofing indicated herein refers to roofing that has been tested, approved and published by third-party laboratories and/or approval agencies. Refer to product information referenced herein, as well as approval agencies and other published listings.

SOPREMA® brand insulation and accessory products are covered by SOPREMA® warranties. Other products sold by SOPREMA® may be covered in SOPREMA® warranties when listed in the warranty. Only the products sold by SOPREMA® are included in the SOPREMA® warranty provided for each project. Products not sold nor supplied by SOPREMA® are excluded from warranty coverage. Refer to specific warranty documents for terms and conditions. For warranty registration requirements, refer to the SOPREMA® on-line project registration form at www.soprema.us, or contact SOPREMA® at 800.356.3521.

The "SOPREMA® LOW-SLOPE ROOFING INSULATION TECHNICAL MANUAL" is intended to offer guidance to SOPREMA® authorized contractors and design professionals. The manual provides guidelines, instructions and details for SOPREMA® roof insulation and accessory products. Refer to applicable building codes, standards and low-slope roofing industry publications for additional requirements and best-practice guidelines.

This manual contains hyperlinks to external documents as well as hyperlinks to *sections*, *tables* and *figures* referenced within the manual. The manual contains hyperlinks to product data sheets, safety data sheets and other product-related information. For additional information refer to www.soprema.us or contact SOPREMA® at 800.356.3521.

DISCLAIMER

This manual is intended for use by SOPREMA® authorized roofing contractors and design professionals in order to provide guidelines, instructions and details for the application of SOPREMA® roof insulation products and accessories when a SOPREMA® warranty will be requested upon project completion. The contents of this manual are consistent with good roofing practices, but are not specific to any particular project's needs and are not a substitute for professional design services. SOPREMA® bears no liability nor responsibility for the evaluation or design of any particular project.

The roofing contractor is responsible for ensuring compliance with contract documents, project specifications, roofing industry standards and jurisdictional codes necessary to meet the requirements for specific project applications.

1 GENERAL

Low slope roofing insulation products included in this manual include rigid insulation boards, tapered rigid insulation boards, tapered edge strips, cover-boards, thermal barriers, insulation cants, insulation adhesives, insulation fasteners and other insulation accessories. This manual contains hyperlinks to external literature that contain additional technical data as well as the safety data sheets.

Warranty: SOPREMA® brand insulation and accessory products are covered by SOPREMA® warranties. Other products sold by SOPREMA® may be covered in SOPREMA® warranties when listed in the warranty. Only the products sold by SOPREMA® are included in the SOPREMA® warranty provided for each project. Products not sold nor supplied by SOPREMA® are excluded from warranty coverage. Refer to specific warranty documents for terms and conditions. For warranty registration requirements, refer to the SOPREMA® on-line project registration form at www.soprema.us, or contact SOPREMA® at 800.356.3521.

1.1 REFERENCES

AMERICAN SOCIETY OF CIVIL ENGINEERS - Reference Document ASCE 7, Minimum Design Loads for Buildings and Other Structures.

AMERICAN STANDARD OF TESTING METHODS (ASTM):

- ASTM C 208 - Standard Specification for Cellulosic Fiber Insulating Board
- ASTM C495 - Standard Test Method for Compressive Strength of Lightweight Insulating Concrete
- ASTM C726 - Standard Specification for Mineral Fiber Roof Insulation Board.
- ASTM C1177 - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing.
- ASTM C1278 - Standard Specification for Fiber-Reinforced Gypsum Panel.
- ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board.
- ASTM C1325 – Standard Specification for Non-Asbestos Fiber-Mat Reinforced Cementitious Backer Units.
- ASTM D41 - Standard Specification for Asphalt Primer Used in Roofing, Damp proofing, and Waterproofing.
- ASTM D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- ASTM E661 - Standard Test Method for Performance of Wood and Wood-Based Floor and Roof Sheathing Under Concentrated Static and Impact Loads.

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI):

- ANSI/SPRI FX-1, Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners.
- ANSI/SPRI IA-1, Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.
- ANSI/FM 4474- American National Standard for Evaluating the Simulated Wind Resistance of Roof Assemblies Using Static Positive and/or Negative Differential Pressures.

CANADIAN GENERAL STANDARDS BOARD (CGSB):

- CGSB 37-GP 56M- Standard for: Modified Bituminous, Prefabricated, and Reinforced for Roofing.

FM GLOBAL (FM):

- FM 4450 - Approval Standard - Class I Insulated Steel Roof Decks.
- FM 4470 - Approval Standard - Class I Roof Covers.
- FM Data Sheet 1-52 - Field Verification of Roof Wind Uplift Resistance

FLORIDA BUILDING CODE (FBC):

- Florida Testing Application Standard (TAS) No. 105 - Test Procedures for Field Withdrawal Testing.
- Florida Testing Application Standard (TAS) No. 124 - Test Procedure for Field Uplift Resistance of Existing Membrane Roof Systems and In Situ Testing for Reroof and New Construction Applications

INTERNATIONAL CODES COUNCIL (ICC):

- International Building Code (IBC).

NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA).

- The NRCA Roofing Manual: Membrane Roof Systems

NATIONAL ROOF DECK CONTRACTORS' ASSOCIATION (NRDCA)

- NRDCA 100 - The National Roof Deck Contractor's Association (NRDCA) Guidelines for Field Application of Aggregate Insulating Concrete Roof Deck Systems
- NRDCA 175 - The National Roof Deck Contractor's Association (NRDCA) Guideline for Field Application of Cellular Insulating Concrete Roof Deck Systems

Polyisocyanurate Insulation Manufacturers Association (PIMA)

- Technical Bulletins, 100 Series: Polyiso Roof Insulation

UNDERWRITERS LABORATORY (UL):

- UL 790 Standard Test Methods for Fire Tests of Roof Coverings.
- UL 1256 – Fire Test of Roof Deck Constructions.

1.2 INSULATION ADHESIVE FIELD TESTING

SOPREMA® does not *require quantitative* adhesion tests to obtain a SOPREMA® warranty when the materials are included within SOPREMA® tested/approved roofing assemblies. Refer to project specifications and jurisdictional building code requirements where additional testing may be necessary.

SOPREMA® *recommends* a simple *qualitative* adhesion test to examine the quality of the adhesive bond between the insulation and substrate when project conditions vary. Conditions where adhesion tests are recommended include:

- Roof recover projects where new insulation will be adhered to existing roofing materials left in place.
- Substrates that vary from job-to-job. Examples of substrates that vary include wood, gypsum, cementitious wood fiber roof decks, masonry, concrete and lightweight insulating concrete.
- Any other substrate that is inconsistent throughout the project, unique, non-standard conditions or conditions that do not meet published substrate requirements.

Qualitative insulation adhesion field test procedures include the following:

- Select three (3) or more test locations that represent each substrate area or sector.
- Clean and prepare the substrate as indicated herein.
- Apply the specified insulation adhesive as indicated herein.
- Bond 2x2 ft (or larger) samples of insulation to the clean/prepared substrate.
- Allow the samples to cure. Refer to adhesive product data for cure times.
- Use a flat-tip spud bar of shovel (preferable with a heel on the back) positioned where the tip of the spud bar or shovel is wedged under the insulation sample.
- Apply consistent, gradual downward pressure on the handle to generate upward force on the underside of the insulation sample.
- Observe results:
    - Adhesive remains bonded to the substrate: Insulation board core separates within the core, or the board facer delaminates: This indicates the adhesive bond is stronger than the cohesive strength of the insulation board. This also indicates the adhesive bond to the substrate is stronger than the cohesive strength of the adhesive itself.
    - Insulation adhesive is removed clean from the substrate or the substrate fails: Examine the substrate surface to determine if the substrate is satisfactory to apply insulation adhesive. Determine if additional substrate preparation is required. Enhance cleaning/preparation and re-test as deemed appropriate.
    - Insulation adhesive fails cohesively: Some adhesive remains on the substrate and some remains on the insulation sample. Examine the adhesive to determine if the adhesive was properly mixed, applied or sufficiently cured. Re-test if deemed appropriate.
- Record and report results. Take photos or video of conditions.

Quantitative insulation adhesion field uplift tests:

- 5ft x 5ft and 2ft x 2ft field uplift tests are commonly used to determine a quantitative value for uplift resistance.
- When *quantitative* results are required, conduct field uplift testing to provide uplift pressure resistance in pounds per square foot (psf). This may be necessary where specified or otherwise required to confirm uplift resistance of materials. SOPREMA® recommends this testing be completed by qualified third-party processional service.
- Record and report the results in accordance with applicable

testing standards.

- Testing standards:
  - Refer to ANSI/SPRI IA-1, *Standard Field Test Procedure for Determining the Mechanical Uplift Resistance of Insulation Adhesives over Various Substrates.*
  - When FM Global requirements are necessary, refer to FM Data Sheet 1-52, *Field Verification of Roof Wind Uplift Resistance*.
  - Refer to jurisdictional requirements where local codes may require other insulation adhesive test standards such as Florida Testing Application Standard (TAS) No. 124, *Test Procedure for Field Uplift Resistance of Existing Membrane Roof Systems and In Situ Testing for Reroof and New Construction Applications.*

1.3 INSULATION FASTENER WITHDRAWAL FIELD TESTING

SOPREMA® does not *require* fastener withdrawal testing to obtain a SOPREMA® warranty when materials are fastened in accordance with tested/approved roofing assemblies. Refer to project specifications, approval listings and jurisdictional building codes for insulation fastener withdrawal field testing requirements and minimum withdrawal resistance (lbf) for fasteners.

SOPREMA® *recommends* fastener withdrawal testing to examine fastener withdrawal resistance when the following deck/substrate conditions exist:

- Deck/substrate materials do not meet published approval requirements or vary in strength such as wood, gypsum, cementitious wood fiber, concrete and lightweight insulating concrete (LWIC).
- Light-gage steel decking less than 22 gage.
- Any other substrate that is unique, non-standard, inconsistent or does not meet published approval requirements.

Quantitative fastener withdrawal tests:

- When *quantitative* values are necessary to confirm design requirements, SOPREMA® recommends the testing and engineering be completed by qualified third-party professional services.
- Refer to ANSI/SPRI FX-1, *Standard Field Test Procedure for Determining the Withdrawal Resistance of Roofing Fasteners*.
- Refer to jurisdictional requirements where local codes may require other fastener withdrawal test standards such as Florida Testing Application Standard (TAS) No. 105, *Test Procedures for Field Withdrawal Testing.*
- Record and report results in accordance with the applicable test standard.

2 THERMAL BARRIERS AND BARRIER BOARDS

2.1 GYPSUM THERMAL BARRIERS AND GYPSUM BARRIER BOARDS

General:

- Gypsum thermal barriers and barrier boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Refer to Section 4.2 GYPSUM COVER-BOARDS for guidelines related to gypsum roof boards used as roof cover-boards.
- Thermal Barrier: A thermal barrier is a fire-resistant roof board separation layer applied to steel decks for *interior fire resistance*. Refer to the International Building Code (IBC) and other applicable jurisdictional code requirements. Refer to SOPREMA® UL listings and FM Approvals for specific thickness and type required for published fire classifications and fire ratings.
- Barrier Board: A barrier board is a roof board fire separation layer that may be applied to combustible wood decks, or incorporated as a cover-board, to meet *exterior fire classifications* (UL Class A, B or C). Barrier boards are listed in UL fire classifications to allow "combustible" wood decks to be deemed "noncombustible" decks only for the purpose of meeting *exterior fire classifications*. Refer to SOPREMA® UL TGFU.R11436 *Roofing Systems* for specific listing requirements to meet UL fire classifications.

- Refer to Table 2.1a for gypsum thermal barrier and barrier board products, and hyperlinks to published product data sheets, safety data sheets (SDS), specific product information, requirements and limitations.
- Refer to Table 2.1b for gypsum board attachment methods and overlying product options installed above.
- Refer to applicable agency listings and approvals for specific system requirements.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to roof board manufacturer's published data for product-specific requirements related to storage, handling and preparation requirements.
- Refer to SOPREMA® published guidelines for vapor retarder, air barrier and roofing membrane preparation.
- Ensure substrates are clean, dry, prepared and otherwise satisfactory to install the boards.

Application:

- Refer to each board manufacturer's published application guidelines.
- Cut boards to fit. Use a chalk-line and razor knife to produce straight, even cuts, score boards and break boards to conform to board transitions and terminations.

- Layout boards in a “running bond” pattern, offset a minimum of 12 in.
- Secure boards to the substrate using the appropriate attachment method.
    - Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
    - Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.
- Refer to board manufacturer for specific instructions related to board joints and “gapping” requirements. Gapping is required at joints for Securock® Brand Gypsum-Fiber Roof Board.
- For steel deck substates, install the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck, do not terminate the edge along the rib opening.

Inspection:

- Refer to each roof board manufacturer’s published guidelines.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Inspect the installation of all boards to ensure board joints are uniform and flush with adjacent boards.
- Follow all applicable project requirements when cleaning and disposing of dust and debris. Ensure surfaces are clean, dry and acceptable to apply materials to the thermal barrier or barrier boards.
- Correct all deficiencies before applying materials to the thermal barrier or barrier boards.
- Do not leave insulation materials exposed over night or during unattended periods.

Table 2.1a [2] Gypsum Thermal Barriers and [2] Gypsum Barrier Boards				
Product	Facer	Thickness	Board Size	[1] Flute Spanability
DEXcell® FA Glass Mat Roof Board	Coated Fiberglass	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	5 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
DEXcell® Glass Mat Roof Board	Fiberglass	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	5 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
DensDeck® Prime Roof Board	Coated Fiberglass	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	5 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
DensDeck® StormX Prime Roof Board	Coated Fiberglass	5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
DensDeck® Roof Board	Fiberglass	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	5 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
Securock® Brand Gypsum-Fiber Roof Board	None	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	10 in
Securock® Brand UltraLight Coated Glass-Mat Roof Board	Coated Fiberglass	1/2 in	4 ft x 4 ft, 4 ft x 8 ft	5 in
		5/8 in	4 ft x 4 ft, 4 ft x 8 ft	8 in
Securock® Brand UltraLight Glass-Mat Roof Board	Fiberglass	1/2 in	4 ft x 8 ft	5 in
		5/8 in	4 ft x 8 ft	8 in

[1] Flute spanability: Maximum recommend steel deck rib opening and other open spans, evaluated per ASTME661. Refer to product manufacturer's published data.

[2] Only the gypsum board products sold by SOPREMA® are included in the SOPREMA® warranty offered for each project.

Table 2.1b Gypsum Thermal Barrier and Gypsum Barrier Board Attachment Options			
Product	**Attachment**	**Membrane and insulation options applied on top of the gypsum board**	
DEXcell® FA Glass Mat Roof Board, DensDeck® Prime Roof Board, DensDeck® StormX Prime Roof Board, Securock® Brand Gypsum-Fiber Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered. ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board.
			Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board. Do not prime gypsum board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime gypsum board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt. Prime gypsum board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
		[4] PVC membrane	SENTINEL bareback PVC: Fully adhered to the gypsum board using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the gypsum board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2). Prime gypsum board with ELASTOCOL™ 500 or ELASTOCOL™ 350 when adhering with hot asphalt.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Fully adhered using hot asphalt (Section 5.2).
	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.

Product	Attachment	Membrane and insulation options applied on top of the gypsum board	
DEXcell® Glass Mat Roof Board, DensDeck® Roof Board, Securock® Brand UltraLight Glass-Mat Roof Board	[1] Polyurethane Foam Adhesive Section 5.1	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1).
	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.
Securock® Brand UltraLight Coated Glass-Mat Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board. Do not prime gypsum board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime gypsum board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
		[4] PVC membrane	SENTINEL bareback PVC: Fully adhered to the gypsum board using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the gypsum board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck.
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1).
	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through gypsum board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

2.2 CEMENT BOARD THERMAL BARRIER AND CEMENT BOARD BARRIER BOARDS

General:

- Thermal barriers and barrier boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Refer to Section 4.3 CEMENT COVER-BOARDS for guidelines related to cement boards used as roof cover-boards.
- Thermal Barrier: A thermal barrier is a fire-resistant roof board separation layer applied to steel decks for *interior fire resistance*. Refer to the International Building Code (IBC) and other applicable jurisdictional code requirements. Refer to SOPREMA® UL listings and FM Approvals for specific thickness and type required for published fire classifications and fire ratings.
- Barrier Board: A barrier board is a roof board fire separation layer that may be applied to combustible wood decks, or incorporated as a cover-board, to meet exterior fire classifications (UL Class A, B or C). Barrier boards are listed in UL fire classifications to allow "combustible" wood decks to be deemed "noncombustible" decks only for the purpose of meeting exterior fire classifications. Refer to SOPREMA® UL TGFU.R11436 *Roofing Systems* for specific listing requirements to meet UL fire classifications.

- Refer to Table 2.2a for cement board thermal barriers and barrier board products, and hyperlinks to published product data sheets, safety data sheets (SDS), specific product information, requirements and limitations.
- Refer to Table 2.2b for cement board attachment methods and overlying product options installed above.
- Refer to applicable agency listings and approvals for specific system requirements.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to roof board manufacturer's published data for product-specific requirements related to preparation.
- Refer to SOPREMA® published guidelines for vapor retarder, air barrier and roofing membrane preparation requirements.
- Ensure thermal barrier substrates are clean, dry, prepared and otherwise satisfactory to install the boards.

Application:

- Refer to each board manufacturer's published product data sheets and safety data sheets (SDS) for specific product application information.
- Using a chalk-line and razor knife to produce straight, even cuts, score boards and break boards to conform to transitions and terminations.
- Layout boards in a "running bond" pattern, offset a minimum of 12 in.
- Secure boards to the substrate using the appropriate attachment method.

- Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
- Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.

- For steel deck substates, install the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck. Do not terminate the edge along the rib opening.

Inspection:

- Refer to each roof board manufacturer's published guidelines.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Inspect the installation of all boards to ensure board joints are uniform and flush with adjacent boards.
- Follow all applicable project requirements when cleaning and disposing of dust and debris. Ensure surfaces are clean, dry and acceptable to apply materials to the thermal barrier or barrier boards.
- Correct all deficiencies before applying materials to the thermal barrier or barrier boards. Inspect all boards to ensure surfaces are flush with adjacent boards.
- Do not leave materials exposed overnight nor during unattended periods.

Table 2.2a Cement Board Thermal Barriers and Barrier Boards[2]

Product	Thickness	Board Size	[1] Flute Spanability*
DEXcell® Cement Roof Board	7/16 in	4 ft x4 ft, 4 ft x 8 ft	12 in
	5/8 in	4 ft x4 ft, 4 ft x 8 ft	12 in
Securock® Brand Cement Roof Board	1/2 in	4 ft x4 ft, 4 ft x 8 ft	12 in
	5/8 in	4 ft x4 ft, 4 ft x 8 ft	12 in

[1]Flute spanability: Maximum recommend steel deck rib opening and other open spans, evaluated per ASTME661. Refer to product manufacturer's published data.

[2] Only the cement board products sold by SOPREMA® are included in the SOPREMA® warranty offered for each project.

Table 2.2b Cement Board Thermal Barrier and Cement Board Barrier Board Installation Options			
Product	**Attachment**	**Membrane and insulation options applied on top of the cement board**	
DEXcell® Cement Roof Board, Securock® Brand Cement Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered. ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for cement board.
			Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for cement board. Do not prime cement board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime cement board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt. Prime cement board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
		[4] PVC membrane	SENTINEL bareback PVC: Fully adhered to the cement board using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the cement board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck
		PMMA	ALSAN RS PMMA: Reinforced, liquid-applied membrane applied to primed cement board. ALSAN® RS 222 PRIMER is required for cement board.
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2). Prime cement board with ELASTOCOL™ 500 or ELASTOCOL™ 350 when adhering with hot asphalt.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Fully adhered using hot asphalt (Section 5.2). Prime cement board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through cement board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through cement board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through cement board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through cement board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

3 INSULATION

3.1 SOPRA-ISO™ POLYISOCYANURATE INSULATION BOARDS

General:

- Refer to polyisocyanurate published product data sheets and safety data sheets (SDS) for specific product composition.
- SOPREMA® SOPRA-ISO™ brand polyisocyanurate insulation products and accessories sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- SOPRA-ISO insulation roof boards consists of faced, rigid cellular polyisocyanurate foam core roof insulation boards produced for low slope roofing applications.

- SOPRA-ISO insulation roof boards are tested per ASTM C1289, *Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board*.
- Refer to the Polyisocyanurate Insulation Manufacturer's Association (PIMA) for general requirements, technical bulletins, and other information related to polyisocyanurate roof insulation boards.
- Refer to *The NRCA Roofing Manual: Membrane Roof Systems, Rigid Board Insulation* for insulation guidelines related to low slope roofing applications.
- Unless otherwise stated in specific technical product data sheets or required by project specifications, the following are general requirements for polyisocyanurate insulation roof boards:
    - The maximum board thickness for adhered polyisocyanurate is 2.6 in thick.
    - The maximum board size for adhered polyisocyanurate insulation is 4 x 4 ft.
    - For multiple layers of insulation, board joints are staggered a minimum of 6 in to prevent board joints from aligning vertically.
- Table 3.1a provides polyisocyanurate Type, Class, Grade and facer material per ASTM C1289. Refer to PIMA Technical Bulletin #117, *Polyiso Insulation Types*.
- Polyisocyanurate insulation boards are produced with a variety of board dimensions, tapered profiles and facers on the board surface. Refer to Table 3.1b for polyisocyanurate products and hyperlinks to product information.
- Polyisocyanurate insulation boards may be incorporated within a wide variety of low slope roofing systems. Refer to Table 3.1c for SOPRA-ISO™ attachment methods and overlying product options installed above the insulation.
- Polyisocyanurate insulation compressive strength and rooftop loads:
    - Compressive strength of polyisocyanurate insulation is measured per ASTM D1621, *Standard Test Method for Compressive Properties of Rigid Cellular Plastics.*
    - Compressive strength is reported in order to compare the relative compressive strength of insulation *Grades*. Refer to PIMA Technical Bulletin #102, *Compressive Strength*. The insulation Grade should not be used to assess long-term *load resistance* for heavy, concentrated rooftop loads.
    - Cover-boards are recommended over polyisocyanurate insulation in order to distribute loads associated with common rooftop traffic and light service loads such as routine maintenance, rooftop conduit supports, and other loads deemed appropriate by the design professional.

    - In order to avoid potential long-term insulation compression issues, heavy concentrated rooftop loads should be supported by independent curbs, stanchions, structural framing and/or the structural deck.
    - Overburden loads such as concrete pavers, pedestals, concrete topping slabs, vegetative roofing materials and other heavy overburden loads should be designed within a protected membrane roof assembly (PRMA) that includes high compressive strength extruded polystyrene (XPS) insulation placed above the waterproofing membrane.
    - When overburden loads are designed over insulated roofing, the following are recommended:
        - Cover-boards are recommended over the polyisocyanurate insulation in order to distribute overburden loads. The cover-board type should be selected by the design professional based on anticipated loads.
        - Cover-board options for overburden include 5/8 in gypsum board, minimum 7/16 cement board, or minimum ¼ in SOPRABOARD™ adhered using insulation adhesive.
        - Polyisocyanurate insulation should consist of Grade 3, 25 psi compressive strength when overburden is designed over insulated roofing.
    - The evaluation and design of roof loads must be completed by the project design professional.
- Refer to applicable agency listings and approvals for specific system requirements.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to roof board published data for product-specific requirements related to storage, handling and preparation requirements.
- Ensure insulation substrates are clean, dry, free of debris and otherwise suitable for the installation of polyisocyanurate insulation.

Application:

- Refer to PIMA Technical Bulletin #109, *Storage and handling Recommendations For Polyiso Roof Insulation* for specific storage and handling requirements.
- Install polyisocyanurate insulation boards to fit tight against adjacent boards without gaps. Gaps greater than ¼ in should be filled or otherwise sealed using appropriate insulation materials.
- Where necessary to cut insulation boards, cut boards in a straight line using saw or knife, with no broken or uneven edges. Use chalk lines or straight-edges to ensure insulation is cut along a straight line. Remove and dispose of dust and debris produced during cutting operations.
- Stagger insulation board joints vertically and laterally to ensure no board joints are aligned.
- For steel deck substates, install the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck, do not terminate the edge along the rib opening.
- Secure boards to the substrate using the appropriate attachment method.
    - Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
    - Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
    - Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.
- Insulation crickets, saddles, and tapered edge strips: Install beneath cover-boards or flat stock insulation boards where applicable. Avoid fastening directly to thin tapered polyisocyanurate insulation boards and

edge strips when the thickness is less than the approved minimum polyisocyanurate thickness. Refer to Section 6.

- Install tapered insulation, saddles and crickets as necessary to ensure positive slope for complete roof drainage.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
- Ensure the finished insulation provides uniform surface, fits tight to adjacent materials, and forms a satisfactory substrate to install subsequent roofing materials.

Inspection:

- Inspect all boards to ensure surfaces are flush with adjacent boards and joints are butted tight.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Ensure surfaces are clean, dry and acceptable to install subsequent overlying materials.
- Ensure insulation is protected during construction to prevent damage from construction traffic and other construction activities.
- Replace all damaged boards before proceeding with overlying materials.
- Do not leave materials exposed overnight nor during unattended periods.

Table 3.1a Polyisocyanurate Insulation ASTM C1289 Classifications & Grades [1]					
Type	**Class**	**Top Facer**	**Bottom Facer**	**Compressive Strength**	**SOPREMA Products**
I	1	Foil	Foil	16 psi	n/a
I	2	Foil	Foil	16 psi	n/a
II	1	Glass reinforced cellulose	Glass Reinforced cellulose	Grade 1: 16 psi Grade 2: 20 psi Grade 3: 25 psi	See Table 3.1b
II	2	Coated glass	Coated glass	Grade 1: 16 psi Grade 2: 20 psi Grade 3: 25 psi	See Table 3.1b
II	3	All glass	All glass	Grade 1: 16 psi Grade 2: 20 psi Grade 3: 25 psi	n/a
II	4	Coated glass/all glass	Coated glass or all glass	Grade 1: 80 psi Grade 2: 110 psi Grade 3: 140 psi	n/a
III	n/a	Perlite board	Glass reinforced/coated glass/all glass	16 psi	n/a
IV	n/a	Wood fiber board	Glass reinforced/coated glass/all glass	16 psi	n/a
V	n/a	OSB or Plywood	Glass reinforced/coated glass/all glass	16 psi	n/a
VII	n/a	Glass mat-faced gypsum board	Glass reinforced/coated glass/all glass	16 psi	n/a

[1] Refer to ASTM C1289 *Standard Specification for Faced Rigid Cellular Polyisocyanurate Insulation Board* for full product specifications.

Table 3.1b Polyisocyanurate Rigid Insulation Boards					
Product	**Equivalent [4]**	**Profile**	**Dimensions**	**Facer**	**Flute Spanability**
SOPRA-ISO®	N/A	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Glass fiber-reinforced felt	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 5/8 in
SOPRA-ISO®+	N/A	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Coated inorganic glass-reinforced	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 5/8 in
SOPRA-ISO® TAPERED	N/A	[2] Tapered	4 ft x 4 ft	Glass fiber-reinforced felt	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 5/8 in
SOPRA-ISO®+ TAPERED	N/A	[2] Tapered	4 ft x 4 ft	Coated inorganic glass-reinforced	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 5/8 in
SOPRA-ISO®r	Hunter H-Shield	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Glass fiber-reinforced felt	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®r TAPERED	Hunter Tapered H-Shield	[2] Tapered	4 ft x 4 ft	Glass fiber-reinforced felt	[3]
SOPRA-ISO®+r	Hunter H-Shield CG	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Coated inorganic glass-reinforced	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®+r TAPERED	Hunter Tapered H-Shield CG	[2] Tapered	4 ft x 4 ft	Coated inorganic glass-reinforced	[3]
SOPRA-ISO®x	RMax Multi-Max® FA-3	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Glass fiber-reinforced felt	1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®x TAPERED	RMax Tapered Thermaroof®-3	[2] Tapered	4 ft x 4 ft	Glass fiber-reinforced felt	[3]
SOPRA-ISO®+x	RMax Ultra-Max®	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Coated inorganic glass-reinforced	1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®+x Tapered	RMax Tapered Ultra-Max®	[2] Tapered	4 ft x 4 ft	Coated inorganic glass-reinforced	[3]
SOPRA-ISO®s	Atlas ACFoam®-II	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Glass fiber-reinforced felt	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®s TAPERED	Atlas Tapered ACFoam®-II	[2] Tapered	4 ft x 4 ft	Glass fiber-reinforced felt	[3]
SOPRA-ISO®+s	Atlas ACFoam®-III	[1] Flat	4 ft x 4 ft, 4 ft x 8 ft	Coated inorganic glass-reinforced	1 in thick: 2 5/8 in, 1.5 in to 4.5 in thick: 4 3/8 in
SOPRA-ISO®+s TAPERED	Atlas Tapered ACFoam®-III	[2] Tapered	4 ft x 4 ft	Coated inorganic glass-reinforced	[3]

[1] Flat board stock ranges from 1 in to 4.5 in thick. Contact SOPREMA® for standard thicknesses.
[2] Tapered board thicknesses vary. Refer to Figure 3.1a and Figure 3.1b. Contact SOPREMA® for standard thicknesses available.
[3] Contact SOPREMA® for additional information.
[4] Only the polyisocyanurate products sold by SOPREMA® are included in the SOPREMA® warranty offered for each project.

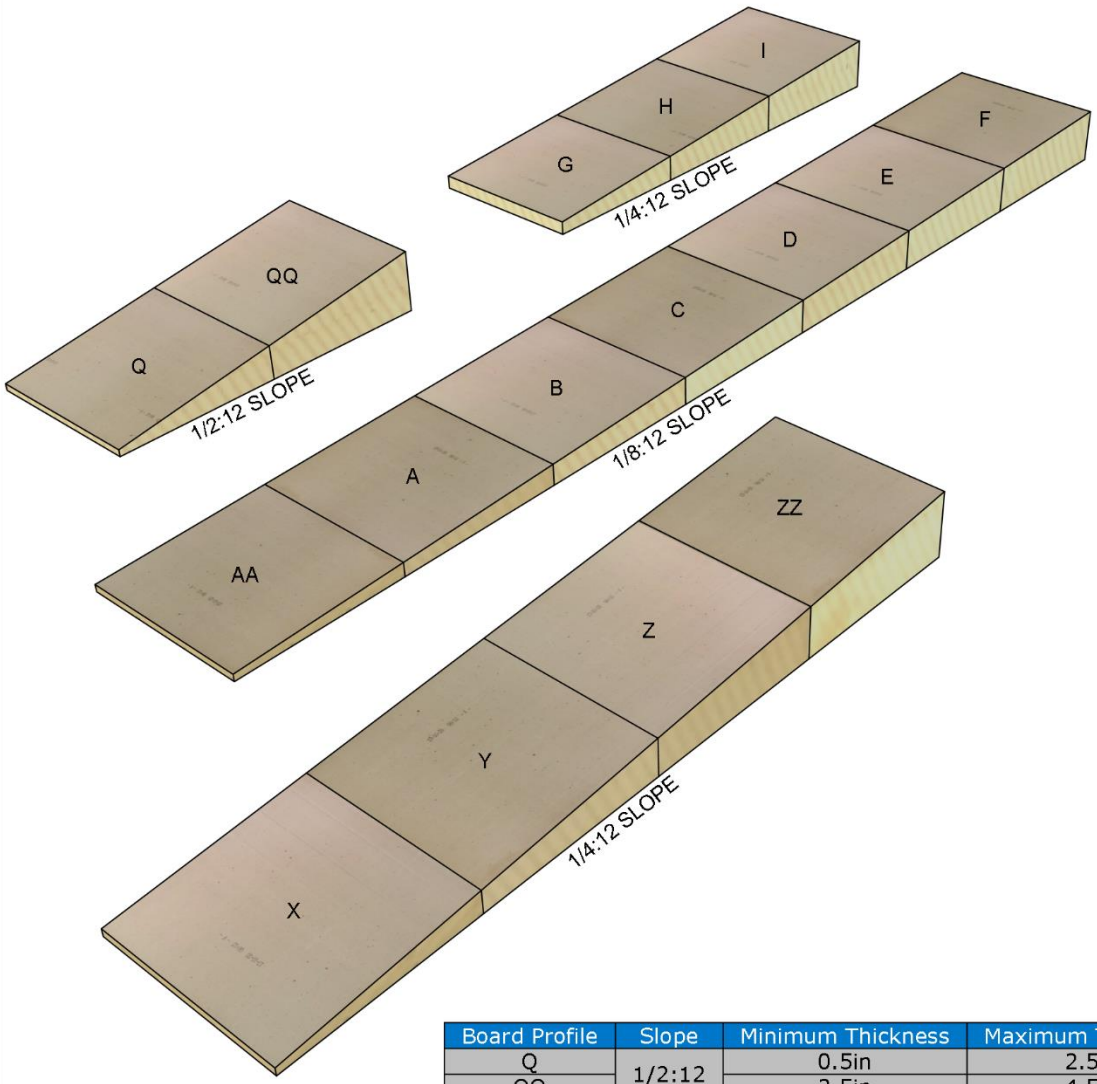
Table 3.1c Polyisocyanurate Rigid Insulation Board Attachment Options			
Product	**Attachment**	**Membrane/insulation options applied on top of the polyisocyanurate board**	
SOPRA-ISO™, SOPRA-ISO™ TAPERED, SOPRA-ISO™r, SOPRA-ISO™r TAPERED, SOPRA-ISO™x, SOPRA-ISO™x TAPERED, SOPRA-ISO™s, SOPRA-ISO™s TAPERED,	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3, [1] Hot Asphalt Section 5.2	[4] PVC membrane	SENTINEL bareback PVC: Fully adhered to the polyisocyanurate board using SENTINEL® S BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the polyisocyanurate board using DUOTACK® SPF HFO (spatter) or ICP Polyset® Commercial Roof Adhesive (spatter).
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten polyisocyanurate board to deck
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			SOPRAROCK mineral wool insulation boards (Section 3.2): Fully adhered using hot asphalt (Section 5.2).
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			Gypsum roof boards (Section 4.2): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1).
			Cement roof boards (Section 4.3): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1).
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS-laminated cover-boards that have SOPRABOARD™ or polyisocyanurate bottom surfaces (Section 4.5): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS laminated cover-boards that have mineral wool bottom surfaces (Section 4.5): Adhered using hot asphalt (Section 5.2).
			High density wood fiberboard (Section 4.6): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).

	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			Gypsum roof boards (Section 4.2): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			Cement roof boards (Section 4.3): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			SOPRASMART® SBS-laminated cover-boards (Section 4.5): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			High density wood fiberboard (Section 4.6): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through polyisocyanurate board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through polyisocyanurate board to deck.
		Cover-boards	SOPRASMART® SBS-laminated cover-boards (Section 4.5): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.

Product	Attachment	Membrane/insulation options applied on top of the polyisocyanurate board	
SOPRA-ISO™+, SOPRA-ISO™+ TAPERED, SOPRA-ISO™+r, SOPRA-ISO™+r TAPERED, SOPRA-ISO™+x, SOPRA-ISO™+x TAPERED, SOPRA-ISO™+s, SOPRA-ISO™+s TAPERED	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3, [1] Hot Asphalt Section 5.2	[4] PVC membrane	SENTINEL bareback PVC: Adhered to the polyisocyanurate board using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the polyisocyanurate board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten polyisocyanurate board to deck
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or adhered using hot asphalt (Section 5.2).
			SOPRAROCK mineral wool insulation boards (Section 3.2): Adhered using hot asphalt (Section 5.2).
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			Gypsum roof boards (Section 4.2): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			Cement roof boards (Section 4.3): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1).
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS-laminated cover-boards that have SOPRABOARD™ or polyisocyanurate bottom surfaces (Section 4.5): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS laminated cover-boards that have mineral wool bottom surfaces (Section 4.5): Adhered using hot asphalt (Section 5.2).
			High density wood fiberboard (Section 4.6): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1) or fully adhered using hot asphalt (Section 5.2).

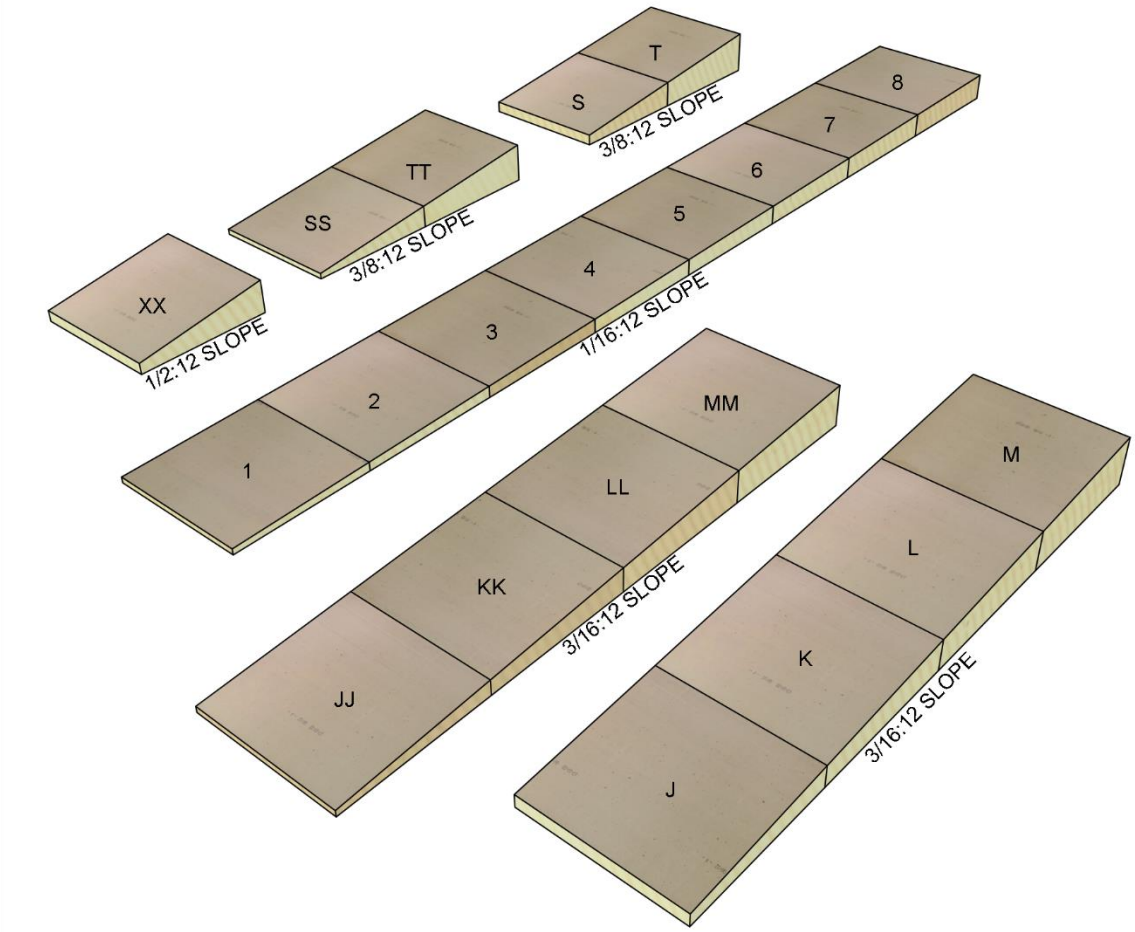
	[2] Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			Gypsum roof boards (Section 4.2): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			Cement roof boards (Section 4.3): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			SOPRASMART® SBS-laminated cover-boards (Section 4.5): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
			High density wood fiberboard (Section 4.6): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through polyisocyanurate board to deck.
		Cover-boards	SOPRASMART® SBS-laminated cover-boards (Section 4.5): Mechanically fastened (Section 5.3) through polyisocyanurate board into deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.



Board Profile	Slope	Minimum Thickness	Maximum Thickness
Q	1/2:12	0.5in	2.5in
QQ		2.5in	4.5in
X	1/4:12	0.5in	1.5in
Y		1.5in	2.5in
Z		2.5in	3.5in
ZZ		3.5in	4.5in
AA	1/8:12	0.5in	1.0in
A		1.0in	1.5in
B		1.5in	2.0in
C		2.0in	2.5in
D		2.5in	3.0in
E		3.0in	3.5in
F		3.5in	4.0in
G	1/4:12	1.0in	2.0in
H		2.0in	3.0in
I		3.0in	4.0in

Figure 3.1a Common Tapered Polyisocyanurate Board Profiles



Board Profile	Slope	Minimum Thickness	Maximum Thickness
XX	1/2:12	1.0in	3.0in
SS	3/8:12	0.5in	2.0in
TT		2.0in	3.5in
JJ	3/16:12	0.5in	1.25in
KK		1.25in	2.0in
LL		2.0in	2.75in
MM		2.75in	3.5in
S	3/8:12	1.0in	2.5in
T		2.5in	4.0in
J	3/16:12	1.0in	1.75in
K		1.75in	2.5in
L		2.5in	3.25in
M		3.25in	4.0in
1	1/16:12	0.5in	0.75in
2		0.75in	1.0in
3		1.0in	1.25in
4		1.25in	1.5in
5		1.5in	1.75in
6		1.75in	2.0in
7		2.0in	2.25in
8		2.25in	2.5in

Figure 3.1b Additional Tapered Polyisocyanurate Board Profiles

3.2 SOPRAROCK® MINERAL WOOL INSULATION BOARDS

General:

- Mineral wool insulation, also known as stone wool, is produced from basalt rock and slag. Refer to published product data sheets and safety data sheets (SDS) for specific product composition.
- SOPREMA® SOPRAROCK mineral wool insulation products sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- SOPRAROCK insulation roof boards are tested to meet ASTM C726, *Standard Specification for Mineral Fiber Insulation Boards.*
- Refer to mineral wool published product data sheets and safety data sheets (SDS) for specific product data, and also refer to Table 3.2a and Table 3.2b below.
    - SOPRAROCK® DD is a noncombustible roof insulation board consisting of unfaced, uncoated, mineral wool produced for low slope roofing applications.
    - SOPRAROCK DD PLUS insulation roof boards have a sanded bitumen surfacing for the adhesion of bitumen roofing. These rigid mineral wool roof insulation boards are produced for use without a separate cover-board for approved bitumen roofing applications.

- Refer to *The NRCA Roofing Manual: Membrane Roof Systems, Rigid Board Insulation* for insulation guidelines related to insulation included in low slope roofing applications.
- Mineral wool insulation compressive strength and rooftop loads:
    - Compressive strength of the insulation is measured per ASTM C165, *Standard Test Method for Measuring Compressive Properties of Thermal Insulations*.
    - Cover-boards are recommended over mineral wool insulation in order to distribute loads associated with common rooftop traffic and light service loads such as routine maintenance, rooftop conduit supports, and other loads deemed appropriate by the design professional.
    - In order to avoid potential long-term insulation compression issues, heavy concentrated rooftop loads should be supported by independent curbs, stanchions, structural framing and/or the structural deck.
    - The evaluation and design of roof loads must be completed by the project design professional.
- Refer to applicable agency listings and approvals for specific system requirements.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to roof board published data for product-specific requirements related to storage, handling and preparation requirements.
- Ensure insulation substrates are clean, dry, free of debris and otherwise suitable for the installation of new insulation.

Application:

- Ensure the high-density insulation board surface is facing up.
- Install insulation boards to fit tight against adjacent boards without gaps. Gaps greater than ¼ in should be filled or otherwise sealed using appropriate insulation materials.
- Where necessary to cut insulation boards, cut boards in a straight line using serrated blade or reciprocating saw, with no uneven edges. Use chalk lines or straight-edges to ensure insulation is cut along a straight line. Remove and dispose of dust and debris produced during cutting operations.
- Stagger insulation board joints vertically and laterally to ensure no board joints are aligned.
- For steel deck substates, install the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck, do not terminate the edge along the rib opening.
- Secure boards to the substrate using the appropriate attachment method.
    - Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
    - Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.
- Insulation crickets, saddles, and tapered edge strips: Install beneath cover-boards or flat stock insulation boards where applicable. Avoid fastening directly to thin tapered insulation boards and edge strips when the thickness is less than the approved minimum insulation thickness. Refer to Section 6.
- Install tapered insulation, saddles and crickets as required to ensure positive slope for complete roof drainage.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
- Ensure the finished insulation provides uniform surface, fits tight to adjacent materials, and forms a satisfactory substrate to install subsequent roofing materials.
- Install specified cants where required for membrane flashing transitions.

Inspection:

- Inspect all boards to ensure surfaces are flush with adjacent boards and joints are butted tight.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Ensure surfaces are clean, dry and acceptable to install subsequent overlying materials.
- Ensure insulation is protected during construction to prevent damage from construction traffic and other construction activities.
- Replace all damaged boards before proceeding with overlying materials.
- Do not leave materials exposed overnight nor during unattended periods.

Table 3.2a Mineral Wool Rigid Insulation Boards

Product	Product Equivalent[2]	Top Surfacing	Profile	Flute Spanability
SOPRAROCK® DD	Rockwool™ TopRock® DD	None	[1]Flat	2 ¾ in
SOPRAROCK® DD PLUS	Rockwool™ TopRock® DD Plus	Bitumen-coated	[1]Flat	2 ¾ in

[1]Flat board thicknesses include 2 to 6 in with 1/2 in increments and are available in 4 ft x 4 ft.

[2] Only the mineral wool products sold by SOPREMA® are included in the SOPREMA® warranty offered for each project.

Table 3.2b Mineral Wool Insulation Board Attachment Options			
Product	**Attachment**	**Membrane/insulation options applied on top of the mineral wool board**	
SOPRAROCK® DD PLUS	Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	[1] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt.
		Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): fully adhered using hot asphalt (Section 5.2).
			SOPRAROCK mineral wool insulation boards (Section 3.2): Fully adhered using hot asphalt (Section 5.2).
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Fully adhered using hot asphalt (Section 5.2).
			Gypsum roof boards (Section 4.2): Fully adhered using hot asphalt (Section 5.2).
			Cement roof boards (Section 4.3): Mechanically fastened through mineral wool to the deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS-laminated cover-boards that have SOPRABOARD™ or polyisocyanurate bottom surfaces (Section 4.5): Fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS laminated cover-boards that have mineral wool bottom surfaces (Section 4.5): Adhered using hot asphalt (Section 5.2).
			High density wood fiberboard (Section 4.6): Fully adhered using hot asphalt (Section 5.2).
	Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through mineral wool board into deck.
			SOPRAROCK® mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through mineral wool board into deck.
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Mechanically fastened through mineral wool to the deck.
			Gypsum roof boards (Section 4.2): Mechanically fastened through mineral wool to the deck.
			Cement roof boards (Section 4.3): Mechanically fastened through mineral wool to the deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Mechanically fastened through mineral wool to deck.
			SOPRASMART® SBS-laminated cover-boards: In-seam fastened through mineral wool to deck.
	Preliminary Fastened Section 5.3.1a	[1] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.

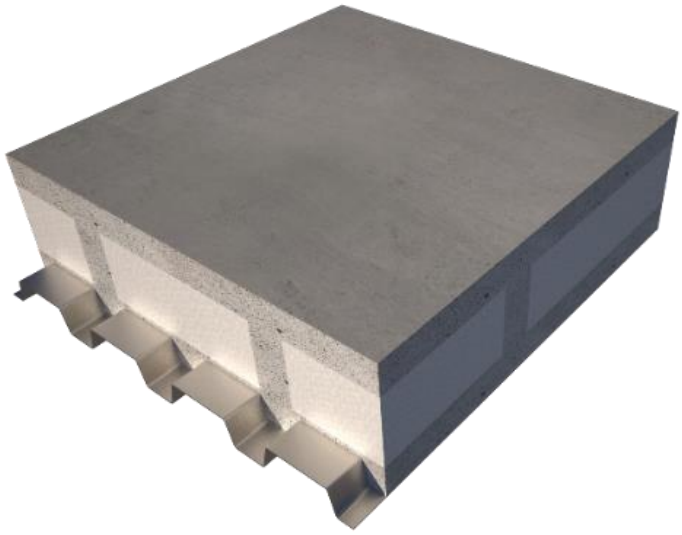
Product	Attachment	Membrane/insulation options applied on top of the mineral wool board	
SOPRAROCK® DD	Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): fully adhered using hot asphalt (Section 5.2).
			SOPRAROCK mineral wool insulation boards (Section 3.2): Fully adhered using hot asphalt (Section 5.2).
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Fully adhered using hot asphalt (Section 5.2).
			Gypsum roof boards (Section 4.2): Fully adhered using hot asphalt (Section 5.2).
			Cement roof boards (Section 4.3): Mechanically fastened through mineral wool to the deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS-laminated cover-boards that have SOPRABOARD™ or polyisocyanurate bottom surfaces (Section 4.5): Fully adhered using hot asphalt (Section 5.2).
			SOPRASMART® SBS laminated cover-boards that have mineral wool bottom surfaces (Section 4.5): Adhered using hot asphalt (Section 5.2).
			High density wood fiberboard (Section 4.6): Fully adhered using hot asphalt (Section 5.2).
	Loose Laid	Rigid insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Loose laid or mechanically fastened (Section 5.3) through mineral wool board into deck.
			SOPRAROCK® mineral wool insulation boards (Section 3.2): Loose laid or mechanically fastened (Section 5.3) through mineral wool board into deck.
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Mechanically fastened through mineral wool to the deck.
			Gypsum roof boards (Section 4.2): Mechanically fastened through mineral wool to the deck.
			Cement roof boards (Section 4.3): Mechanically fastened through mineral wool to the deck.
			High-Density (HD) polyisocyanurate cover-board (Section 4.4): Mechanically fastened through mineral wool to deck.
			SOPRASMART® SBS-laminated cover-boards: In-seam fastened through mineral wool to deck.
	Preliminary Fastened Section 5.3.1a	[1] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[2] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.

[1] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[2] Refer to *PVC Membrane Roofing Technical Manual*.

3.3 CELLULAR LIGHTWEIGHT INSULATING CONCRETE

General:

- Lightweight insulating concrete (LWIC) is acceptable for use as a SOPREMA® roofing membrane substrate. There are a wide range of proprietary LWIC materials. Refer to Table 3.3a and Table 3.3b. Contact SOPREMA® and refer to specific warranty documents for terms and conditions.
- When a SOPREMA® warranty is required, ensure LWIC applicators review SOPREMA® warranty documents and requirements for LWIC and agree to comply with the requirements indicated herein prior to beginning work.
- There are two general types of LWIC materials referenced in this manual:
    - Aggregate LWIC includes lightweight perlite or vermiculite aggregates and Portland cement. Aggregate LIWC is commonly designed for roofing with a dry density between 20 to 40 pounds per cubic foot (pcf). Compressive strength is generally between 125 pounds and 400+ pounds per square inch (psi). Refer to published agency approval requirements.
    - Cellular LWIC includes pre-generated foam and Portland cement to form the lightweight cellular concrete. Cellular LWIC is commonly designed for roofing to have a cast density between 34 and 48 pcf and a dry density of 26 pounds to 40 pcf. Compressive strength is generally 200 to 400+ psi. Refer to published agency approval requirements.



- For some roof designs the LWIC is considered roof insulation supported by a separate structural roof deck, while other roof designs include the LWIC and deck together as a composite roof decking system.
- LWIC is applied to create a positive roof slope for drainage and provides above-deck continuous roof insulation.
- Insulation R value is achieved by expanded polystyrene (EPS) insulation set into a wet slurry coat of LWIC, then encapsulated within the LWIC.
- A topping of LWIC is applied over the EPS boards to form the finished roofing membrane substrate.
- LWIC compressive strength and rooftop loads:
    - Compressive strength of the LWIC is measured per ASTM C495 - *Standard Test Method for Compressive Strength of Lightweight Insulating Concrete.*
    - LWIC distributes loads associated with common rooftop traffic and light service loads such as routine maintenance, rooftop conduit supports, and other loads deemed appropriate by the design professional.
    - In order to avoid potential damages from heavy concentrated rooftop loads, rooftop equipment and fixtures should be supported by independent curbs, stanchions, structural framing and/or the structural deck.
    - The evaluation and design of roof loads must be completed by the project design professional.
- Design new LWIC to vent and dry excess water in the LWIC. This may be achieved by designing vented steel decking, perimeter venting details and/or spun aluminum one-way vents spaced evenly at the rate of 1 vent per 1,000 sq ft of roof area.

- SOPREMA roofing membranes are approved for use with both aggregate and cellular LWIC. Refer to Table 3.3a. for cellular LWIC options. For additional LWIC options contact SOPREMA®.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to Table 3.3b for cellular LWIC substrate options for SOPREMA® roofing.
- Refer to project construction documents, the LWIC manufacturer's published guidelines and/or published roofing industry guidelines for LWIC preparation requirements.
- Ensure LWIC substrates are clean and free of frost, snow, standing water, debris and any material that prevents proper LWIC bond to the substrate.
- Monitor weather and project conditions to ensure conditions remain acceptable for LWIC.
- Ensure the LWIC substrate materials are properly installed and properly prepared to receive the LWIC.

Application:

- Application guidance indicated herein for LWIC is limited to requirements necessary to ensure a suitable substrate for SOPREMA® roofing, for warranty purposes only. Refer to design specifications, agency approvals, jurisdictional codes and other industry requirements indicated below.
- Apply LWIC in accordance with the following requirements:
    - The LWIC manufacturer's published installation guidelines. Where no manufacturer's published guidelines exist, follow NRDCA and NRCA guidelines for LWIC.
    - The National Roof Deck Contractor's Association (NRDCA) *Guideline for Field Application of Cellular Insulating Concrete Roof Deck Systems* document available on-line.
    - The National Roof Deck Contractor's Association (NRDCA) *Guidelines for Field Application of Aggregate Insulating Concrete Roof Deck Systems* document available on-line.
    - *The NRCA Roofing Manual: Membrane Roof Systems-Lightweight insulating concrete*, current edition.
    - Project construction documents and LWIC specifications.
    - Applicable building codes and approval requirements for LWIC.
- Mix foam concentrate, cement, water and admixtures per manufacturer's requirements to yield required properties for the LWIC.
- Apply a sufficient LWIC slurry onto the substrate to fill all substrate voids and depressions, and ensure a consistent wet slurry coat is applied no less than 1/8 in. The bottom of the EPS should be separated from direct contact with the substrate surface with no less than 1/8 in of LWIC.
- When LWIC concrete is applied to steel deck substrates, fill the ribs with LWIC plus a sufficient thickness above the top flange of the deck to ensure EPS insulation is fully adhered into a wet slurry coat no less than 1/8 in thick. The bottom of the EPS should be separated from direct contact with the steel deck top flange, with no less than 1/8 in of LWIC on top of the steel deck flange.
- Set approved EPS insulation boards with keying holes to ensure the underside of the EPS boards makes full contact with the wet slurry coat and the EPS board is fully encapsulated and adhered into a minimum 1/8 in of slurry coat.
- Set the EPS boards into the wet slurry coat to prevent voids between the EPS and LWIC slurry coat. Apply additional slurry coat as needed to fill low areas, dips and depressions in the substate. Ensure the EPS is fully bonded to the LWIC slurry coat.
- Set EPS insulation boards in a "running bond" pattern and install EPS boards as necessary to ensure slope to roof drainage.

- Allow the LWIC to adequately set to bond to the EPS insulation boards to the slurry coat. During this setting period prevent traffic and other operations that may break the bond between the EPS boards and the slurry coat.
- Apply LWIC onto the EPS insulation boards while filling the keying holes with LWIC.
- Ensure the minimum required thickness of LWIC is applied above the EPS insulation boards.
- Comply with jurisdictional approval requirements and the specified top coat thickness needed for roofing membrane fasteners. Apply no less than 2 in of LWIC top coating over EPS boards.
- During application of LWIC, screed the LWIC concrete to ensure a uniform surface is achieved while maintaining the required LWIC top coat thickness.
- Ensure the finished LWIC provides positive slope with no standing nor ponding water on any LWIC surfaces.
- Once the lightweight concrete has sufficiently cured to support foot traffic, apply curing compounds where specified, typically within 24 hours of LWIC pour.

Inspection:

- During LWIC application, weigh samples and record cast density. Ensure LWIC wet density is within the acceptable range for the specified LWIC.
- During LWIC application, cast cylinders for compressive strength testing for each LWIC batch. Test compressive strength in accordance with ASTM C495 and record results. Ensure the compressive strength complies with project requirements.
- During application of the LWIC, inspect conditions, and adjust EPS layout and LWIC pour as necessary to ensure the finished LWIC creates a positive slope to drains.
- Ensure LWIC provides a uniform substate for the specified SOPREMA® roofing in the field of the roof at all roof penetrations, transitions and terminations.
- Refer to published requirements for LWIC curing periods before allowing rooftop traffic and before initiating roofing operations.
- Cure time/drying time required between LWIC pour and roofing installation varies based on project and environmental conditions. Weather conditions and precipitation will impact the time required between LWIC pour and roofing installation. LWIC surfaces should be *surface-dry* when roofing is applied.
- Before installing the roof membrane, inspect and test the membrane attachment method:
    - When SOPREMA® roofing will be fastened to the LWIC, perform fastener pull tests if required in accordance with Section 1.3 INSULATION FASTENER WITHDRAWAL FIELD TESTING.
    - When SOPREMA® roofing membranes will be adhered to LWIC, perform membrane adhesion tests. Refer to applicable SOPREMA® roofing technical manuals for membrane adhesion test requirements.
    - When SOPREMA® roofing insulation will be adhered to LWIC, perform insulation adhesion tests as required in Section 1.2 INSULATION ADHESIVE FIELD TESTING.

Table 3.3a Cellular Lightweight Insulating Concrete (LWIC)

Manufacturer	Product	Foaming Agent	Insulation Board
Celcore Incorporated	Celcore	Celcore MF Foam Concentrate	[1]Celcore Expanded Polystyrene Holey Board
Elastizell Corporation of America	Elastizell	Elastizell JLE Foam Concentrate	[1]ASTM C578
Aerix Industries™	Mearlcrete™	Mearlcrete Foam Liquid Concentrate	[1]ASTM C578
Concrecel USA	Concrecel	Concrecel Foam	[1]ASTM C578

[1]Flat, 2 ft by 4 ft expanded polystyrene (EPS) boards with keying holes. EPS thickness varies 1 to 12 in.

Table 3.3b Cellular Lightweight Insulating Concrete (LWIC) Overlying Insulation and Membrane Options			
Product	**Substrates**	**Membrane and insulation options applied on top of the cellular lightweight**	
Celcore, Elastizell, Mearlcrete™, Concrecel	Slotted steel deck, Steel deck, SBS base ply with sanded surface, SBS cap sheet with granular surface, Structural concrete	[3] SBS anchor sheets	SBS anchor sheets: Mechanically fastened (Section 5.3) with FM-90 BASE SHEET FASTENER, TWIN LOC-NAIL, or VERSA-FAST® PLATE and VERSA-FAST® FASTENERS.
		[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS base plies with TRI-FIXX™ FASTENING SYSTEM, TWIN LOC-NAIL, or VERSA-FAST® PLATE and VERSA-FAST® FASTENERS.
			Cold adhesive-applied, polyester reinforced SBS: Partially adhered with ribbons of COLPLY™ EF ADHESIVE.
		[4] PVC membrane	SENTINEL fleece-backed PVC: Adhered to the polyisocyanurate board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
		Rigid Insulation	SOPRA-ISO polyisocyanurate insulation boards (Section 3.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1), mechanically fastened (Section 5.3) into the LWIC with VERSA-FAST® PLATE and VERSA-FAST® FASTENERS or mechanically fastened (Section 5.3) through the LWIC into deck.
			SOPRAROCK mineral wool insulation boards (Section 3.2): Mechanically fastened (Section 5.3) into the LWIC with VERSA-FAST® PLATE and VERSA-FAST® FASTENERS or mechanically fastened (Section 5.3) through the LWIC into deck.
		Cover-boards	SOPRABOARD™ asphaltic cover-board (Section 4.1): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1), mechanically fastened (Section 5.3) into the LWIC with VERSA-FAST® PLATE and VERSA-FAST® FASTENERS or mechanically fastened (Section 5.3) through the LWIC into deck.
			Cement roof boards (Section 4.3): Adhered using (ribbon-applied) polyurethane foam adhesive (Section 5.1), mechanically fastened (Section 5.3) into the LWIC with VERSA-FAST® PLATE and VERSA-FAST® FASTENERS or mechanically fastened (Section 5.3) through the LWIC into deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

4 COVER-BOARDS

4.1 SOPRABOARD™ ASPHALTIC COVER-BOARD

General:

- SOPRABOARD™ is an asphaltic cover-board composed of a mineral fortified asphaltic core formed between two fiberglass reinforcing plies.
- SOPRABOARD™ is included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- SOPRABOARD™ is attached to roofing substrates using a variety of attachment methods for a wide range of membrane options. Refer to Table 4.1a for attachment methods and membrane options.

- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.
- Refer to the SOPRABOARD™ PDS and SDS for additional product information.

Preparation:

- Refer to the SOPRABOARD™ PDS and SDS for product-specific requirements related to storage, handling, and preparation requirements.
- Ensure substrates are clean, dry, free of debris and otherwise suitable to install SOPRABOARD™.

Application:

- Install boards to fit tight against adjacent boards without gaps between boards. Gaps greater than ¼ in should be filled or otherwise sealed using appropriate materials.
- Where necessary to cut boards, cut boards in a straight line using saw or knife, with no broken or uneven edges. Use chalk lines or straight-edges to ensure boards are cut along a straight line. Remove and dispose of debris produced during cutting operations.
- Install SOPRABOARD™ onto uniform, continuous solid roofing substrates. Substrates include board stock insulation, existing smooth roof surfaces for recover applications, lightweight insulating concrete, concrete, wood, cementitious wood fiber and gypsum roof decks.
- SOPRABOARD™ should be fully supported, not applied over open spans and large gaps. SOPRABOARD™ is not approved for direct-to-steel deck applications.
- Stagger cover-board joints vertically and laterally with the insulation beneath the cover-board to ensure board joints are not aligned.
- Secure boards to the substrate using appropriate attachment methods:
    - Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.

- Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
- Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.

- Ensure the finished cover-board installation provides a uniform surface, fits tight to adjacent materials, and forms a satisfactory substrate to install subsequent roofing membrane materials.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.

Inspection:

- Inspect all boards to ensure surfaces are flush with adjacent boards and joints are butted tight.
- Ensure surfaces are clean, dry and acceptable to install subsequent overlying materials.
- Ensure boards are protected during construction to prevent damage from construction traffic and other construction activities.
- Replace all damaged boards before proceeding with overlying membrane materials.
- Do not leave cover-board materials exposed overnight nor during unattended periods.

Table 4.1a SOPRABOARD™ Asphaltic Cover-Boards		
Product	**Thickness**	**Board Size**
SOPRABOARD™	1/8 in	4 ft x 4 ft, 4 ft x 5 ft, 4 ft x 8ft
	3/16 in	
	1/4 in	

Table 4.1b SOPRABOARD™ Asphaltic Cover-Boards			
Product	**Attachment**	**Membrane options applied on top of SOPRABOARD™**	
SOPRABOARD™	[1] Polyurethane Foam Adhesive Section 5.1, [1] Mechanical Fasteners Section 5.3, [1] Hot Asphalt Section 5.2	[2] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered.
			Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt.
	[1] Preliminary Fastened Figure 5.3.1a, Figure 5.3.2a, or Figure 5.3.3a	[2] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through SOPRABOARD™ to deck.

[1] Maximum 4 ft x 8 ft boards.
[2] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.

4.2 GYPSUM COVER-BOARDS

General:

- Gypsum cover-boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Refer to Table 4.2a for gypsum cover-board products, and hyperlinks to published product data sheets, safety data sheets (SDS), specific product information, requirements and limitations.
- Refer to Table 4.2b for gypsum cover-board attachment methods and overlying membrane options installed above.
- Refer to applicable agency listings and approvals for specific system ratings and approval requirements.
- Refer to each gypsum roof board hyperlink in the tables below for specific product information.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.

- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to the gypsum roof board manufacturer's product-specific requirements related to storage, handling and preparation requirements.
- Ensure substrates are clean, dry, free of debris and otherwise suitable to install gypsum cover-boards.

Application:

- Refer to each roof board manufacturer's published application guidelines.
- Cut boards to fit. Use a chalk-line and razor knife to produce straight, even cuts, score boards and break boards to conform to board transitions and terminations.
- Layout boards in a "running bond" pattern, offset a minimum of 12 in.
- When installing the cover-board directly to steel decks, locate the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck, not terminated over the rib opening.
- Secure boards to the substrate using appropriate attachment methods:
    - Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
    - Asphalt insulation adhesive: Calcination is the release of moisture from gypsum when gypsum is exposed to high temperatures. To avoid calcination and membrane blistering, do not encapsulate gypsum boards in hot asphalt (do not adhere the gypsum board in hot asphalt then apply hot asphalt to adhere the roofing membrane). Refer to Section 5.2 for asphalt adhesive application requirements.
    - Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.

- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
- Refer to board manufacturer for specific instructions related to board joints and "gapping" requirements. Gapping is required between Securock® Brand Gypsum-Fiber Roof Board.

Inspection:

- Refer to each roof board manufacturer's published guidelines.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Inspect the installation of all boards to ensure board joints are uniform and flush with adjacent boards.
- Follow all applicable project requirements when cleaning and disposing of dust and debris. Ensure surfaces are clean, dry and acceptable to apply materials to the thermal barrier or barrier boards.
- Correct all deficiencies before applying materials to the thermal barrier or barrier boards.
- Do not leave materials exposed during unattended periods.

Table 4.2a Gypsum Cover-Boards			
Product	**Thickness**	**Board Size**	**Facer**
DEXcell® Glass Mat Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	Fiberglass
	1/2 in		
	5/8 in		
DEXcell® FA Glass Mat Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	Coated Fiberglass
	1/2 in		
	5/8 in		
DensDeck® Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	Fiberglass
	1/2 in		
	5/8 in		
DensDeck® Prime Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	Coated Fiberglass
	1/2 in		
	5/8 in		
DensDeck® StormX Prime Roof Board	5/8 in	4 ft x4 ft, 4 ft x 8 ft	Coated Fiberglass
Securock® Brand UltraLight Glass-Mat Roof Board	1/4 in	4 ft x 8 ft	Fiberglass mat
	1/2 in		
	5/8 in		
Securock® Brand Gypsum-Fiber Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	None
	3/8 in		
	1/2 in		
	5/8 in		
Securock® Brand UltraLight Coated Glass-Mat Roof Board	1/4 in	4 ft x4 ft, 4 ft x 8 ft	Coated Fiberglass
	1/2 in		
	5/8 in		

Table 4.2b Gypsum Cover-boards Attachment Options			
Product	**Attachment**	**Overlying Membrane Options**	
DEXcell® FA Glass Mat Roof Board, DensDeck® Prime Roof Board, DensDeck® StormX Prime Roof Board, Securock® Brand Gypsum-Fiber Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered. ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board.
			Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board. Do not prime cement board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime gypsum board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt. Prime gypsum board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
		[4] PVC membrane	SENTINEL bare PVC: Fully adhered to insulation using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE
			SENTINEL fleeceback PVC: Adhered to insulation using DUOTACK® SPF HFO (spatter) or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.
DEXcell® Glass Mat Roof Board, DensDeck® Roof Board, Securock® Brand UltraLight Glass-Mat Roof Board	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.

Product	Attachment	Overlying Membrane Options	
Securock® Brand UltraLight Coated Glass-Mat Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Cold adhesive-applied, polyester reinforced SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for gypsum board. Do not prime gypsum board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime gypsum board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
		[4] PVC membrane	SENTINEL bare PVC: Fully adhered to insulation using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE
			SENTINEL fleeceback PVC: Adhered to insulation using DUOTACK® SPF HFO (spatter) or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through gypsum board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through gypsum board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

4.3 CEMENT COVER-BOARDS

General:

- Cement cover-boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Refer to Table 4.3a for cement cover-board products, and hyperlinks to published product data sheets, safety data sheets (SDS), specific product information, requirements and limitations.
- Refer to Table 4.3b for cement cover-board attachment methods and overlying membrane options installed above.
- Refer to applicable agency listings and approvals for specific system ratings and approval requirements.
- Refer to each cement board hyperlink in the tables below for specific product information.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to the cement board manufacturer's product-specific requirements related to storage, handling and preparation requirements.
- Ensure substrates are clean, dry, free of debris and otherwise suitable to install cement cover-boards.

Application:

- Refer to each board manufacturer's published application guidelines.
- Cut boards to fit. Use a chalk-line and razor knife to produce straight, even cuts, score boards and break boards to conform to board transitions and terminations.
- Layout boards in a "running bond" pattern, offset a minimum of 12 in.
- When installing the cover-board directly to steel decks, locate the board edges that run parallel with the ribs such that the board edges are supported by the top flange of the steel deck, not terminated over the rib opening.
- Secure boards to the substrate using appropriate attachment methods:
    - Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
    - Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
    - Insulation fasteners: Refer to Section 5.3 for insulation fastener options and installation requirements.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.

Inspection:

- Refer to each roof board manufacturer's published guidelines.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Inspect the installation of all boards to ensure board joints are uniform and flush with adjacent boards.
- Follow all applicable project requirements when cleaning and disposing of dust and debris. Ensure surfaces are clean, dry and acceptable to apply materials to the thermal barrier or barrier boards.
- Correct all deficiencies before applying materials to the thermal barrier or barrier boards.
- Do not leave materials exposed during unattended periods.

Table 4.3a Cement Cover-Boards		
Product	**Thickness**	**Board Size**
DEXcell® Cement Roof Board	7/16 in	4 ft x4 ft, 4 ft x 8 ft
	5/8 in	
Securock® Brand Cement Roof Board	7/16 in	4 ft x4 ft, 4 ft x 8 ft
	5/8 in	

Table 4.3b Cement Cover-Board Attachment Options			
Product	**Attachment**	**Membrane and insulation options applied on top of the cement board**	
DEXcell® Cement Roof Board, Securock® Brand Cement Roof Board	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3	[3] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered. Prime cement board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
			Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF. For COLPLY, ELASTOCOL™ 500 or ELASTOCOL™ 350 primer is optional for cement board. Do not prime cement board when using COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime cement board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen: Fully adhered using Type IV hot asphalt. Prime cement board with ELASTOCOL™ 500 or ELASTOCOL™ 350.
		[4] PVC membrane	SENTINEL bareback PVC: Fully adhered to the cement board using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL fleece-backed PVC: Adhered to the cement board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck
		PMMA	ALSAN RS PMMA: Reinforced, liquid-applied membrane applied to primed cement board. ALSAN® RS 222 PRIMER is required for cement board.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through cement board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through cement board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

4.4 SOPRA-ISO™ HIGH DENSITY POLYISOCYANURATE COVER-BOARDS

General:

- SOPRA-ISO™ HD is a high density rigid polyisocyanurate board composed of a closed cell polyisocyanurate foam core. SOPRA-ISO™ HD is produced with a coated glass facer. Refer to Table 4.4a.
- Cover-boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- SOPRA-ISO™ HD can be installed below a variety of roofing membranes by a variety of application methods. Refer to Table 4.4b.
- SOPRA-ISO™ HD roof boards are tested per ASTM C1289, *Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board,* Type II, Class 4, Grades 1, 2 and 3. Refer to PIMA Technical Bulletin #501, *High-Density Polyiso Cover Boards* for general information related to high-density polyisocyanurate roof cover-boards.
- Refer to the Polyisocyanurate Insulation Manufacturer's Association (PIMA) for general requirements, technical bulletins, and other information related to polyisocyanurate roof insulation boards.
- Refer to *The NRCA Roofing Manual: Membrane Roof Systems, Rigid Board Insulation* for insulation guidelines related to low slope roofing applications.
- Refer to applicable agency listings and approvals for specific system ratings and approval requirements.
- Refer to each roof board hyperlink in the tables below for specific product information.
- Follow insulation system component product data sheets, published general requirements and approvals.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to the roof board product-specific requirements related to storage, handling and preparation requirements.
- Ensure substrates are clean, dry, free of debris and otherwise suitable to install the cover-boards.

Application:

- Refer to PIMA Technical Bulletin #109*, Storage and handling Recommendations For Polyiso Roof Insulation* for specific storage and handling requirements.
- Install polyisocyanurate insulation boards to fit tight against adjacent boards without gaps. Gaps greater than ¼ in should be filled or otherwise sealed using appropriate insulation materials.
- Where necessary to cut insulation boards, cut boards in a straight line using saw or knife, with no broken or uneven edges. Use chalk lines or straight-edges to ensure insulation is cut along a straight line. Remove and dispose of dust and debris produced during cutting operations.
- Stagger the cover-board joints vertically and laterally to ensure no board joints are aligned.
- Secure boards to the substrate using the appropriate attachment method.

- Insulation adhesive: Refer to Section 5.1 for DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
- Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
- Insulation fasteners: Refer to Section 5.3 for fastener options and installation requirements.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
- Ensure the finished insulation provides uniform surface, fits tight to adjacent materials, and forms a satisfactory substrate to install subsequent roofing materials.

Inspection:

- Inspect all boards to ensure surfaces are flush with adjacent boards and joints are butted tight.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Ensure surfaces are clean, dry and acceptable to install subsequent overlying materials.
- Ensure insulation is protected during construction to prevent damage from construction traffic and other construction activities.
- Replace all damaged boards before proceeding with overlying materials.
- Do not leave materials exposed overnight nor during unattended periods.

Table 4.4a High Density Polyisocyanurate Cover-boards				
Product	**Manufacturer Equivalent**	**Thickness**	**Dimensions**	**Facer**
SOPRA-ISO™ HD	N/A	0.5 in	4 ft x 4 ft, 4 ft x 8 ft	Coated fiberblass
SOPRA-ISO™ HDs	Atlas ACFoam®-HD CoverBoard	0.5 in	4 ft x 4 ft, 4 ft x 8 ft	Coated fiberblass
SOPRA-ISO™ HDr	Hunter H-Shield HD	0.5 in	4 ft x 4 ft, 4 ft x 8 ft	Coated fiberblass

Table 4.4b High Density Polyisocyanurate Cover-Board Attachment Options			
Product	**Attachment**	**Overlying Membrane Options**	
SOPRA-ISO™ HD, SOPRA-ISO™ HDs, SOPRA-ISO™ HDr	[1] Polyurethane Foam Adhesive Section 5.1	[4] PVC membrane	SENTINEL bare PVC: Fully adhered to insulation using SENTINEL® S BONDING ADHESIVE or SENTINEL® H2O BONDING ADHESIVE
			SENTINEL fleece-backed PVC: Adhered to the polyisocyanurate board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter), or SENTINEL® H2O BONDING ADHESIVE.
			SENTINEL polyester reinforced, bareback PVC: Induction welded to fastener plates used to fasten gypsum board to deck.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through polyisocyanurate board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through polyisocyanurate board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

4.5 SOPRASMART® SBS LAMINATED COVER-BOARDS

General:

- SOPRASMART® boards consist of roof insulation and/or cover-boards boards with a factory-laminated SBS membrane base ply adhered to the board surface.
- The SBS base ply options include a sanded top surface or a plastic burn-off film top surface.
- The SBS base ply side-laps on the SOPRASMART® boards are produced with a 3 in wide DUO SELVEDGE seal. The side-lap seal consists of a combination of self-adhesive to seal the inner edge of the lap and a heat-welded outer edge to seal the outer edge watertight.
    - SOPRASMART® 2-1: The two-in-one products include an SBS base ply factory-laminated to a coverboard. Cover-board options include SOPRABOARD™, high-density mineral wool, or high-density polyisocyanurate.
    - SOPRASMART® 3-1: The three-in-one products include an SBS base ply factory-laminated to your choice of coverboard that is factory-adhered to a polyisocyanurate insulation. SOPRASMART® 3-1 cover-board options include SOPRABOARD™, high-density mineral wool, or high-density polyisocyanurate.
    - Refer to Table 4.5a for a complete list of SOPRASMART® options available.
- SOPRASMART® board ends are butted together and aligned. The aligned end-laps are sealed using the SOPRALAP™ membrane ply. There are four SOPRALAP™ options available, produced in 13 in wide rolls. Refer to Table 4.5b for SOPRALAP™ options.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Refer to the SOPRASMART® board PDS and SDS for product-specific requirements related to storage, handling and preparation requirements.
- Ensure substrates are clean, dry, free of debris and otherwise suitable to install SOPRASMART® boards.

Application:

- SOPRASMART® boards may be adhered to roofing substrates or fastened to the roof deck.
- Adhered SOPRASMART® boards:
    - Lay out insulation and SOPRASMART® boards to ensure the SOPRASMART® joints do not align with the preceding board joints.
    - When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
    - Start by installing the SOPRASMART® boards at the low point of the roof or at roof drains, then proceed up-slope.
    - Apply the appropriate insulation adhesive to the substate. Refer to Section 5.1 for polyurethane insulation adhesive and Section 5.2 for hot asphalt adhesive applications.

- Ensure the SOPRASMART® board joints are butted tightly, and the DUO SELVEDGE membrane side-lap overlaps onto the adjacent board surface in a “shingle fashion.”
- Ensure SOPRASMART® ends are butted tightly together, and the 1 in membrane end-lap is overlapped onto the adjacent board surface.
- Ensure the SOPRASMART® boards are held firmly in place while the adhesive cures to ensure the boards are properly adhered in place.
- Once the SOPRASMART® boards are adhered in place, remove the self-adhesive release film within the DUO SELVEDGE membrane side-laps. As the release film is removed, apply pressure to the top of the side-lap using a weighted roller.
- Heat-weld the remaining outer edge of the SOPRASMART® membrane side-lap to ensure all side-laps are sealed watertight.
- At SOPRASMART® board end-laps, ensure the 1 in membrane lap is overlapped onto the adjacent board.
- Seal the end-laps watertight using the appropriate SOPRALAP™ membrane. Ensure the 13 in wide SOPRALAP™ membrane is centered over the SOPRASMART® board end joints.
- SOPRALAP™ membrane application:
  - The SOPRALAP™ FLAM and SOPRALAP™ SP membrane rolls are heat welded over the SOPRASMART® board ends joints.
  - The SOPRALAP™ SANDED membrane rolls are adhered over the SOPRASMART® board end joint using COLPLY® ADHESIVE, COLPY® EF ADHESIVE or hot asphalt.
  - Before installing SOPRALAP™ STICK self-adhesive membrane rolls, prime the SOPRASMART® board surface using ELASTOCOL™ STICK or ELASTOCOL™ STICK ZERO self-adhesive primer. Unroll the SOPRALAP™ STICK in place over the SOPRASMART® board end joints and remove the release film.

- Fastened SOPRASMART boards
  - Lay out insulation and SOPRASMART® boards to ensure the SOPRASMART® joints do not align with the preceding board joints.
  - When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
  - Lay out boards to ensure side-lap fasteners will engage the top flange of steel decks.
  - Start by installing the SOPRASMART® boards at the low point of the roof or at roof drains, then proceed up-slope.
  - Ensure the SOPRASMART® board joints are butted tightly, and the DUO SELVEDGE membrane side-lap overlaps onto the adjacent board surface in a “shingle fashion.”
  - Ensure SOPRASMART® end joints are butted tightly together, and the 1 in membrane end-lap is overlapped onto the adjacent board surface.
  - Install 2 in diameter fastener seam plates within the DUO SELVEDGE membrane side-lap.
  - Ensure spacing between fasteners in the side-laps complies with the required wind uplift approval spacing. Refer to Section 5.3 for mechanical fastening.
  - Install fasteners as necessary to firmly set the fastener and seam plate tight against the side-lap, do not overdrive fasteners. Prevent wrinkles from forming in the side-lap as the fasteners are installed.
  - At the end of the SOPRASMART® board where the board terminates at roof edges, roof penetrations, curbs, drains, etc. fasten the end of the SOPRASMART® board into the deck no more than 12 in apart.
  - Once the SOPRASMART® boards are fastened in place, remove the self-adhesive release film within the DUO SELVEDGE membrane side-laps. As the release film is removed, apply pressure to the top of the side-lap using a weighted roller.
  - Heat-weld the remaining outer edge of the SOPRASMART® membrane side-lap to ensure all side-laps are sealed watertight.

- At SOPRASMART® board end joints, ensure the 1 in membrane end lap is overlapped onto the adjacent board.
- Seal the end-lap using the appropriate SOPRALAP™ membrane. Ensure the 13 in wide SOPRALAP™ membrane is centered over the SOPRASMART® board end joint.
- SOPRALAP™ membrane application:
  - The SOPRALAP™ FLAM and SOPRALAP™ SP membrane rolls are heat welded over the SOPRASMART® board end joints.
  - The SOPRALAP™ SANDED membrane rolls are adhered over the SOPRASMART® board end joint using COLPLY® ADHESIVE, COLPY® EF ADHESIVE or hot asphalt.
  - Before installing SOPRALAP™ STICK self-adhesive membrane rolls, prime the SOPRASMART® board surface using ELASTOCOL™ STICK or ELASTOCOL™ STICK ZERO self-adhesive primer. Unroll the SOPRALAP™ STICK in place over the SOPRASMART® board end joints and remove the release film.

Inspection:

- Each day, physically inspect all side-laps and end-laps to ensure the SOPRASMART® boards are sealed watertight. Repair all voids, wrinkles, open laps and all other damages and deficiencies before installing subsequent materials above SOPRASMART® board.
- Ensure all SOPRASMART® board terminations are secure and sealed watertight.

Table 4.5a SOPRASMART® SBS Modified Bitumen Laminated Cover-boards						
Product	Cover-Board	Cover-Board Thickness	Insulation	Insulation Thickness	Board Dimension	SBS Top Surfacing
2-1 SOPRASMART® BOARD	SOPRABOARD™	1/8 in, 1/4 in	n/a	n/a	3 ft x 8 ft	Plastic burn-off film
2-1 SOPRASMART® BOARD SANDED	SOPRABOARD™	1/8 in, 1/4 in	n/a	n/a	3 ft x 8 ft	Sanded
3-1 SOPRASMART® BOARD	SOPRABOARD™	1/8 in, 1/4 in	Polyisocyanurate	[1] 2 in	3 ft x 8 ft	Plastic burn-off film
3-1 SOPRASMART® BOARD SANDED	SOPRABOARD™	1/8 in, 1/4 in	Polyisocyanurate	[1] 2 in	3 ft x 8 ft	Sanded
2-1 SOPRASMART® ISO HD	High density polyisocyanurate	1/2 in	n/a	n/a	3 ft x 8 ft, 3 ft x 16 ft	Plastic burn-off film
2-1 SOPRASMART® ISO HD SANDED	High density polyisocyanurate	1/2 in	n/a	n/a	3 ft x 8 ft, 3 ft x 16 ft	Sanded
2-1 SOPRASMART® ROCK	High density mineral wool	[2] 1 in, 1.5 in	n/a	n/a	3 ft x 16 ft	Plastic burn-off film
2-1 SOPRASMART® ROCK SANDED	High density mineral wool	[2] 1 in, 1.5 in	n/a	n/a	3 ft x 16 ft	Sanded
3-1 SOPRASMART® ROCK	High density mineral wool	[3] 1 in	Polyisocyanurate	[1] 2 in	3 ft x 8 ft	Plastic burn-off film
3-1 SOPRASMART® ROCK SANDED	High density mineral wool	[3] 1 in	Polyisocyanurate	[1] 2 in	3 ft x 8 ft	Sanded

[1] Standard Thickness. Insulation also available in 1 in, 1.5 in, 2.5 in, 3 in, 3.5 in, and 4 in upon request.
[2] Standard Thickness. Cover-Board also available in 2 in, 2.5 in, and 3 in upon request.
[3] Standard Thickness. Cover-Board also available in 1.5 in, 2 in, 2.5 in, and 3 in upon request.

Table 4.5b SOPRASMART® SBS Modified Bitumen Laminated Cover-board Joint Treatments				
Product	Application	Bottom Surfacing	Top Surfacing	Width
SOPRALAP™ FLAM	Heat-welded	Plastic burn-off film	Plastic burn-off film	13 in
SOPRALAP™ STICK	Self-adhered	Release film	Sanded	13 in
SOPRALAP™ SP	Heat-welded	Plastic burn-off film	Sanded	13 in
SOPRALAP™ SANDED	Adhered	Sanded	Sanded	13 in

Table 4.5c SBS Modified Bitumen Laminated Cover-board Attachment Options			
Product	**Attachment**	**Overlying Membrane Options**	
2-1 SOPRASMART® BOARD, 3-1 SOPRASMART® BOARD, 2-1 SOPRASMART® ISO HD, 3-1 SOPRASMART® ROCK	Polyurethane Foam Adhesive Section 5.1, Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	[1] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered.
2-1 SOPRASMART® ROCK	Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	[1] SBS base plies	Heat-welded SBS modified bitumen: Fully adhered.
2-1 SOPRASMART® BOARD SANDED, 3-1 SOPRASMART® BOARD SANDED, 2-1 SOPRASMART® ISO HD SANDED, 3-1 SOPRASMART® ROCK SANDED	Polyurethane Foam Adhesive Section 5.1, Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	[1] SBS base plies	Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime cover-board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen base plies: Fully adhered using Type IV hot asphalt.
		[2] PVC membrane	SENTINEL fleece-backed PVC: Adhered to the SBS surfacing using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter).
		PMMA	ALSAN RS PMMA: Reinforced, liquid-applied membrane applied to cover- board.
2-1 SOPRASMART® ROCK SANDED	Mechanical Fasteners Section 5.3, Hot Asphalt Section 5.2	[1] SBS base plies	Cold adhesive-applied SBS modified bitumen: Fully adhered using COLPLY or COLPLY EF.
			Self-adhesive applied SBS modified bitumen: Fully adhered. Prime cover-board with ELASTOCOL™ STICK, ELASTOCOL™ STICK ZERO, or ELASTOCOL™ STICK H2O.
			Hot asphalt-applied SBS modified bitumen base plies: Fully adhered using Type IV hot asphalt.
		[2] PVC membrane	SENTINEL fleece-backed PVC: Adhered to the cover-board using DUOTACK® SPF HFO (spatter), ICP Polyset® Commercial Roof Adhesive (spatter).
		PMMA	ALSAN RS PMMA: Reinforced, liquid-applied membrane applied to cover- board.

[1] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[2] Refer to *PVC Membrane Roofing Technical Manual*.

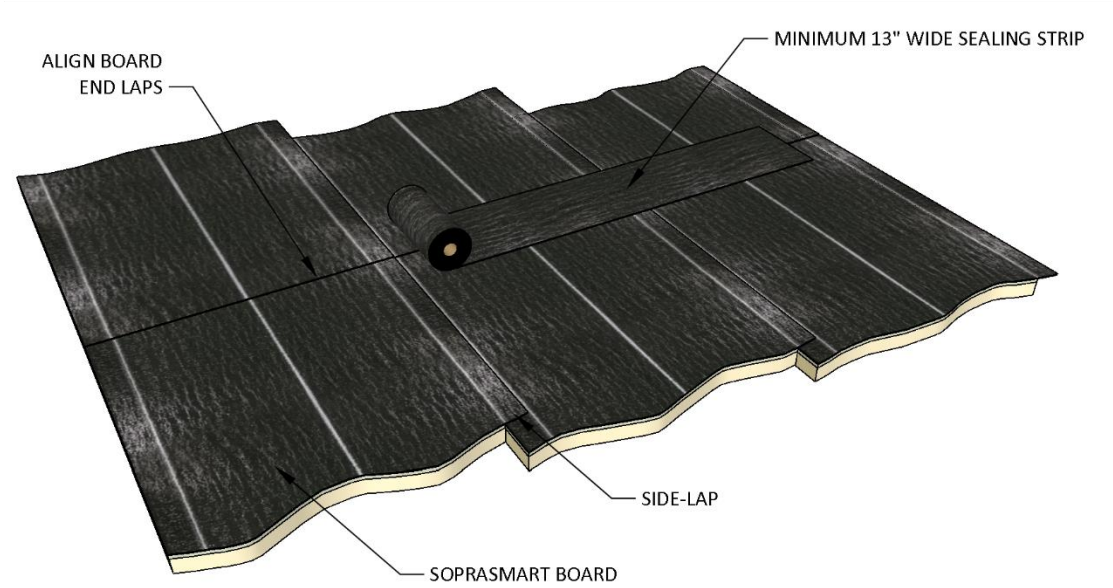


Figure 4.5a SOPRASMART® Board End Laps

4.6 WOOD FIBER COVER-BOARDS

General:

- Structodek® HD Fiberboard with Primed Red Coating cover-board is a high density wood fiberboard, primed with a non-asphaltic proprietary red primed coating.
- Structodek® HD Fiberboard with Primed Red Coating cover-board meets ASTM C 208, Type II, Grade 1 and 2 - *Standard Specification for Cellulosic Fiber Insulating Board*.
- Cover-boards sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Structodek® HD Fiberboard with Primed Red Coating can be installed as a cover-board for a variety of roofing membranes options. Refer to Table 4.6b.
- Refer to The *NRCA Roofing Manual: Membrane Roof Systems, Rigid Board Insulation for insulation* guidelines related to low slope roofing applications.
- Refer to applicable agency listings and approvals for specific system ratings and approval requirements.
- Refer to the hyperlink in the tables below for specific product information.
- Follow insulation system component product data sheets, published general requirements and approvals.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Ensure substrates are clean, dry and otherwise satisfactory to receive wood fiber cover-boards.
- Prime substrates as required for hot asphalt adhesives (if used).

Application:

- Install boards to fit tight against adjacent boards without gaps. Gaps greater than ¼ in should be filled or otherwise sealed using appropriate insulation materials.
- Where necessary to cut insulation boards, cut boards in a straight line using saw or knife, with no broken or uneven edges. Use chalk lines or straight-edges to ensure insulation is cut along a straight line. Remove and dispose of dust and debris produced during cutting operations.
- Stagger the cover-board joints vertically and laterally to ensure no board joints are aligned.
- Secure boards to the substrate using the appropriate attachment method.
    - Insulation adhesive: Refer to ICP Polyset® Commercial Roof Adhesive and Trufast Roofing Adhesive 2-part polyurethane foam adhesive options and application requirements.
    - Asphalt insulation adhesive: Refer to Section 5.2 for asphalt adhesive application requirements.
- Insulation fasteners: Refer to Section 5.3 for fastener options and installation requirements.
- When materials are installed over crickets and saddles, the overlying materials will change direction slightly at the cricket/saddle perimeter. In order to address the slope direction change, install the overlying materials to address the change in roof slope direction, and prevent gaps/wrinkles in the overlying materials.
- Ensure the finished cover-board provides uniform surface, fits tight to adjacent materials, and forms a satisfactory substrate to install subsequent roofing materials.

Inspection:

- Inspect all boards to ensure surfaces are flush with adjacent boards and joints are butted tight.
- Inspect all boards during application to ensure boards are properly attached to substrates.
- Ensure surfaces are clean, dry, and acceptable to install subsequent overlying materials.
- Ensure insulation is protected during construction to prevent damage from construction traffic and other construction activities.
- Replace all damaged boards before proceeding with overlying materials.
- Do not leave materials exposed overnight nor during unattended periods.

Table 4.6a Wood Fiber Cover-Boards		
Product	**Thickness**	**Board Size**
Structodek® HD Fiberboard with Primed Red Coating	1/2 in	4 ft x 4 ft, 4 ft x 8 ft

Table 4.6b Wood Fiber Cover-Board Attachment Options			
Product	**Attachment**	**Overlying Membrane Options**	
Structodek® HD Fiberboard with Primed Red Coating	[1] Polyurethane Foam Adhesive Section 5.1, [2] Mechanical Fasteners Section 5.3, [1] Hot Asphalt Section 5.2	[3] SBS base plies	Cold adhesive-applied SBS with COLPLY™ or COLPLY™ EF.
			Hot asphalt-applied SBS base plies with Type IV asphalt.
	[2] Preliminary Fastened Figure 5.3.1a or Figure 5.3.2a	[3] SBS base plies	SOPRAFIX: Mechanically fastened SBS modified bitumen base ply through cover-board to deck.
		[4] PVC membrane	SENTINEL polyester reinforced PVC: Mechanically fastened through cover-board to deck.

[1] Maximum 4 ft x 4 ft boards.
[2] Maximum 4 ft x 8 ft boards.
[3] Refer to *SBS-Modified Bitumen Membrane Roofing Technical Manual*.
[4] Refer to *PVC Membrane Roofing Technical Manual*.

5 INSULATION ATTACHMENT

SOPREMA® insulation attachment guidelines are offered for SOPREMA® warranty purposes only. Guidance provided herein is not specific to any particular project design and is not a substitute for professional design services. Figure 5a and Figure 5b provide general guidance to determine roof zone size and dimensions for SOPREMA® warranty purposes only. Refer to jurisdictional codes and design documents necessary to comply with wind uplift resistance requirements.

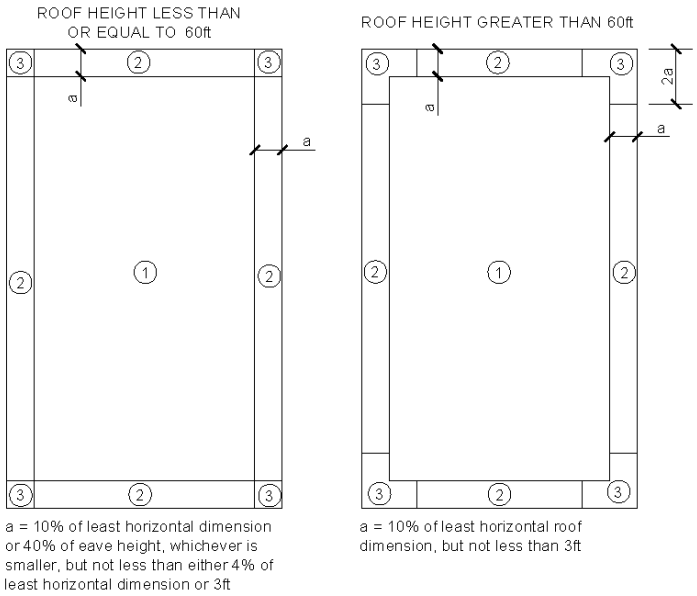


Figure 5a ASCE 7-05/10 Roof Zones for Low-Slope Roofs ϑ≤7°

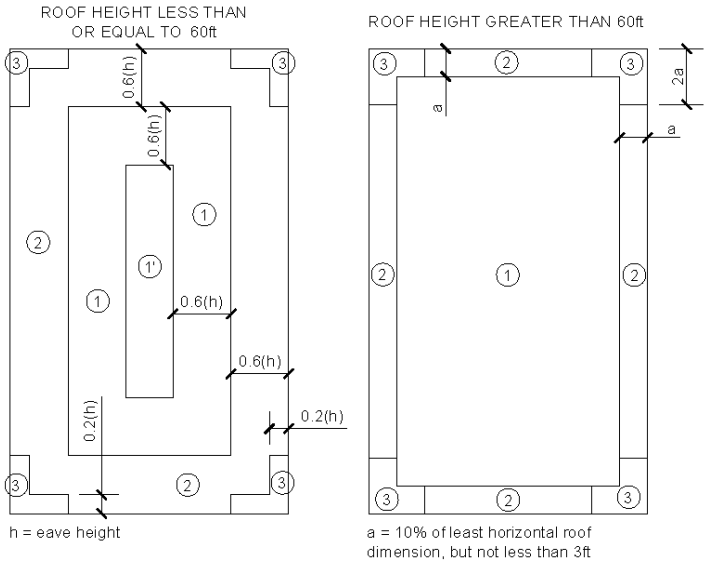


Figure 5b ASCE 7-16 Roof Zones for Low-Slope Roofs ϑ≤7°

5.1 POLYURETHANE FOAM INSULATION ADHESIVE

General:

- Two-part polyurethane foam insulation adhesives are produced to adhere roof insulation and roof cover-boards to roofing substrates. The two liquid components are packaged in two separate containers and mixed upon application.
- Insulation adhesives sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- DUOTACK® 365:
    - DUOTACK® 365 is a 2-part (Part A and B), low-rise, polyurethane foam adhesive. The liquid components are pumped through a static mixing tip to mix and dispense the two components as a liquid adhesive mixture onto the roofing substrate in minimum ½ to ¾ inch wide ribbons (beads).
    - Packaging: DUOTACK® 365 units contain both Parts A and B, packaged in 1.5 liter cartridges, 10 gallon "cubitanier" sets, 30 gallon mini drum sets and 100 gallon drum sets.
    - Application equipment: Guns for cartridges, pump carts for container and drum sets.

- DUOTACK® SPF HFO:
    - DUOTACK® SPF HFO is a 2-part (Part A and B), polyurethane adhesive. Components are stored in two separate pressurized tanks. The components are delivered through hoses to a single nozzle where the two components are mixed and dispensed onto the roof substrate as an adhesive mixture in minimum 2-1/2 to 3-1/2 inch wide ribbons (beads).
    - Packaging: DUOTACK® SPF HFO units contain both Part A and B, packaged as kits containing two pressurized cylinders, a 25 ft hose and an application gun and nozzles.
    - Application equipment: Pressurized cylinder kits.
- ICP Polyset® Commercial Roof Adhesive:
    - ICP Polyset® Commercial Roof Adhesive is a 2-part (Part A and B), polyurethane adhesive. Components are stored in two separate pressurized tanks. The components are delivered through hoses to a single nozzle where the two components are mixed and dispensed onto the roof substrate as an adhesive mixture in minimum 2-1/2 to 3-1/2 inch wide ribbons (beads).
    - Packaging: ICP Polyset® Commercial Roof Adhesive units contain both Part A and B, packaged as kits containing two pressurized cylinders, a 25 ft hose and an application gun and nozzles.
    - Application equipment: Pressurized cylinder kits.
- Trufast Roofing Adhesive:
    - Trufast Roofing Adhesive is a 2-part (Part A and B) low-rise, polyurethane foam adhesive. The liquid components are pumped through a static mixing tip to mix and dispense the two components as a liquid adhesive mixture onto the roofing substrate in minimum ¾ to 1 inch wide ribbons (beads).
    - Packaging: Trufast Roofing Adhesive is packaged in 1.5 liter cartridges and drum sets.
    - Application equipment: Guns for cartridges, pump carts for container and drum sets.
- Two-part polyurethane foam insulation adhesives are approved for use with a wide range of low-slope roofing insulation, cover-boards and roofing substrates. Refer to Table 5.1a below.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.

- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Follow all published instructions for each insulation product's preparation requirements.
- Refer to product information related to storage conditions.
- During cold weather, follow published cold weather storage requirements. Store adhesives in heated storage areas during cold weather. Do not expose adhesive to cold temperatures for extended periods before use. Refer to adhesive product data for recommended temperature limits.
- Insulation adhesives cure quickly during hot weather, and when applied onto hot substrates. Monitor conditions closely and adjust the application as needed to ensure the adhesive has not skinned over or cured before setting the insulation boards into the adhesive. Refer to adhesive product data for recommended temperature limits.
- Ensure substrates are clean, dry and free of water, frost, ice. Ensure substrates are free of uncured/wet liquid primers and adhesives, oils, grease, incompatible contaminants, dirt, sand, loose substrate materials and other adverse substrate conditions that prevent adhesion.
- Where project substrate conditions are suspect, examine adhesion to ensure conditions are suitable before beginning the insulation adhesive application. Refer to Section 1.2 Insulation Adhesive Field Testing.

Application:

- Follow the specific insulation adhesive's published instructions for complete information related to equipment, use and installation. Refer to the latest information published on-line or contact SOPREMA® for the latest published information. Refer to hyperlinks to product information included below.
- Refer to Section 5.1.1 below for general ribbon (bead) spacing patterns offered for SOPREMA® warranty purposes only. Contact SOPREMA® for project-specific warranty requirements and project registration.
- Comply with project design requirements for insulation attachment. Refer to project design documents, specifications, agency approvals and jurisdictional codes to comply with attachment needed for each roof zone (the roof field, perimeter and corner zones). Attachment requirements provided in this manual are for SOPREMA® warranty purposes only and are not offered as a substitution for roof design services.
- Refer to design documents for roof zones, and install the appropriate ribbon (bead) spacing for each board to comply with project requirements for each roof zone. Refer to Figure 5a and Figure 5b for roof zones dimensions.
- Ribbon (bead) width and spacing indicated herein are minimum requirements. Apply adhesive to meet the following minimum requirements:
    - DUOTACK® 365:
        - Dispense insulation adhesive in uniform ribbons 1/2 in to 3/4 in wide. See Figure 5.1.1a and Figure 5.1.1b. Ribbons should flow and expand 2-1/2 to 3 in wide when boards are applied and held in place while the adhesive cures.
    - DUOTACK® SPF HFO:
        - Dispense insulation adhesive in uniform ribbons, 2-1/2 to 3-1/2 in wide. Apply boards and hold in place while the adhesive cures. See Figure 5.1.1a and Figure 5.1.1b.
    - ICP Polyset® Commercial Roof Adhesive:
        - Dispense insulation adhesive in uniform ribbons, 2-1/2 to 3-1/2 in wide. Apply boards and hold in place while the adhesive cures. See Figure 5.1.1a and Figure 5.1.1b.
    - Trufast Roofing Adhesive:
        - Dispense insulation adhesive in uniform ribbons, ¾ in to 1 in wide. Ribbons should flow and expand 2-1/2 to 3 in wide when boards are applied and held in place while the adhesive cures. See Figure 5.1.1a and Figure 5.1.1b.
- The maximum spacing between ribbons (beads) is 12 in on-centers.
- Refer to Section 5.1.1 for generic prescriptive enhancements for ribbon spacing in roof perimeter and corner zones.

- Contact SOPREMA® for project-specific spacing requirements needed for a SOPREMA® warranty.
- Wind uplift resistance requirements vary. Refer to specific approvals and listings for the ribbon (bead) width and ribbon spacing to meet project-specific wind rating requirements.
- Adhesive application rates vary based on substrate roughness and porosity. Rough and porous substrates such as cementitious wood fiber roof decks require more adhesive in order to achieve a proper ribbon (bead) width and proper adhesive bond. Conduct adhesion testing prior to beginning application as indicated in Section 1.2 Insulation Adhesive Field Testing.
- Apply enough adhesive to install one board at a time. Avoid delays to prevent adhesive from "skinning-over" or curing before boards are set in place.
- Do not allow insulation adhesive to "skin-over" or cure prematurely before placing the board into the "wet" adhesive.
- Once the insulation adhesive ribbons (beads) are dispensed, immediately install boards into the "wet" adhesive.
- Apply uniform weight over the board to ensure each board is held in full contact with all adhesive ribbons. Hold uniform weight in place on the board until the adhesive has set/cured sufficiently to hold the board firmly in place.
- When stepping boards in place, use caution to prevent hazards associated with boards sliding out of place and breaking the adhesive bond.
- Do not allow boards to lift and break contact with the insulation adhesive. If the board breaks contact with the adhesive before the adhesive has set/cured sufficiently, the adhesive bond strength may be compromised.
- Adhesive set/cure times vary based on project conditions, weather and temperature. Monitor conditions and application closely to ensure proper adhesive bond.
- Adhesive cures faster during hot humid conditions, and cures slower during cold dry conditions. Refer to each insulation adhesive product data for guidance related to cure time.

Inspection:

- During application, examine the adhesive to ensure the adhesive parts A and B are properly mixed. Refer to guidance provided by each insulation adhesive's published instructions. Refer to hyperlinks to product information included herein, or contact SOPREMA®.
- During application, inspect boards to ensure boards are flush with adjacent boards and flush with adjacent materials, to provide a uniform substate for the subsequent materials to be applied on the boards.
- Once the adhesive has sufficiently cured, inspect for loose/unadhered boards. Remove and replace or otherwise repair loose boards to ensure all boards are properly adhered.
- When project conditions are suspect, conduct adhesion tests as needed to demonstrate satisfactory adhesion is being achieved. Refer to Section 1.2 INSULATION ADHESIVE FIELD TESTING.

Table 5.1a Polyurethane Foam Adhesive Substrates	
Adhesive	**Substrates**
DUOTACK® 365, DUOTACK® SPF HFO, ICP Polyset® Commercial Roof Adhesive, Trufast Roofing Adhesive	Concrete & masonry units
	Cellular lightweight concrete. See Section 3.3.
	Gypsum plank
	Poured gypsum
	Cementitious wood fiber
	Wood
	Steel
	SOPRAVAP'R
	Modified bitumen with sanded surfacing
	Modified bitumen with granular surfacing
	Smooth surfaced anchor sheets and bitumen membranes
	PMMA embedment coat with embedded sand
	Gypsum thermal barrier boards. See Section 2.1.
	Cement thermal barrier boards. See Section 2.2.
	Polyisocyanurate insulation boards. See Section 3.1.

Contact SOPREMA® for other substrate options acceptable for insulation adhesive.

5.1.1 FOUR FOOT WIDE BOARD ADHESION PATTERNS

ZONE 1

- PARALLEL RIBBONS AT 12" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

ZONE 2

- PARALLEL RIBBONS AT 6" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

ZONE 3

- PARALLEL RIBBONS AT 4" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

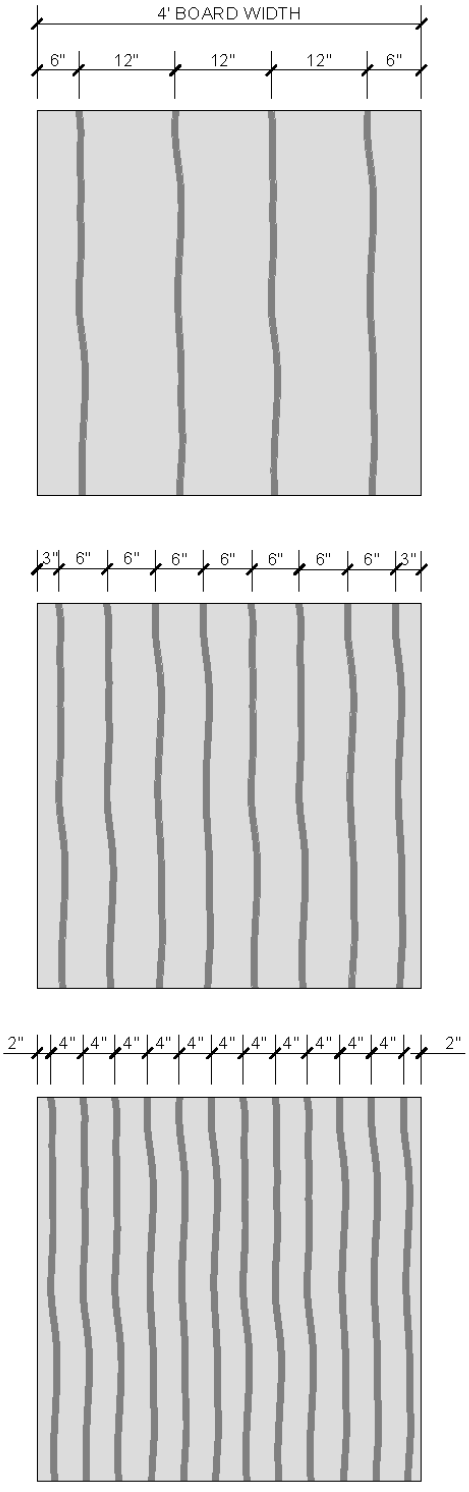


Figure 5.1.1a Four Feet Wide Board, Ribbon Adhered, 12in O.C. Adhesion Pattern

ZONE 1

- PARALLEL RIBBONS AT 6" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

ZONE 2

- PARALLEL RIBBONS AT 4" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

ZONE 3

- PARALLEL RIBBONS AT 4" O.C.
- REFER TO INSULATION ADHESIVE PRODUCT DATA SHEET FOR RIBBON WIDTH

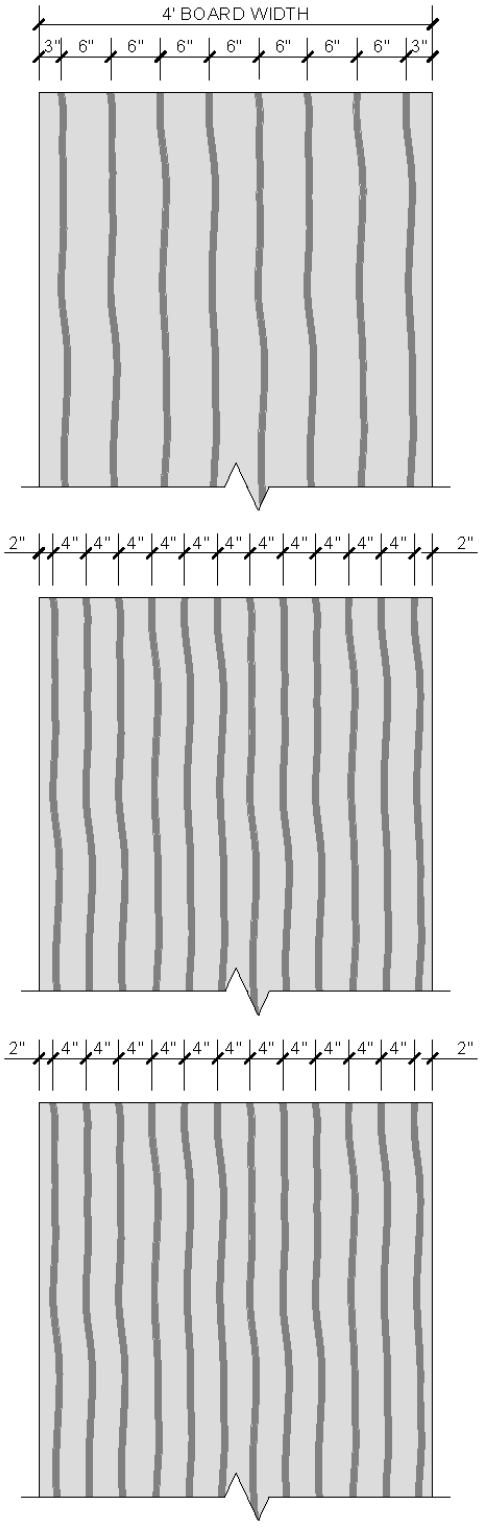


Figure 5.1.1b Four Feet Wide Board, Ribbon Adhered, 6in O.C. Adhesion Pattern

5.1.2 SBS MODIFIED BITUMEN LAMINATED COVER-BOARD ADHESION PATTERNS

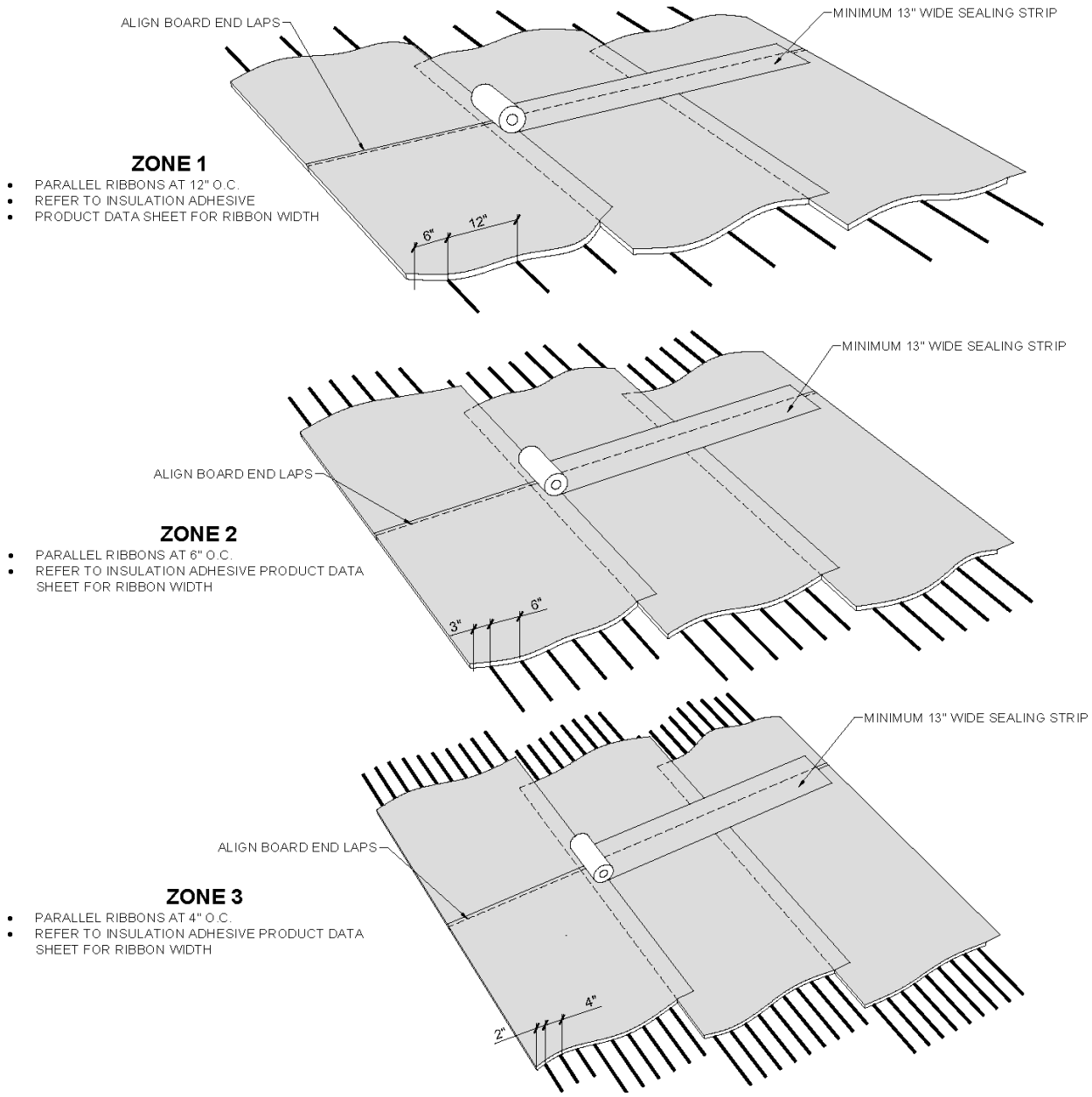


Figure 5.1.2a SBS Modified Bitumen Laminated Cover-Board, Ribbon Adhered, 12in O.C. Adhesion Pattern

5.2 HOT ASPHALT INSULATION ADHESIVE

General:

- Mopping asphalt is an acceptable adhesive for adhering roof insulation and roof coverboards to roofing substrates. Refer to Table 5.2.a below for options.
- Ensure asphalt used as an insulation adhesive complies with ASTM D312 *Standard Specification for Asphalt Used in Roofing,* Type III or Type IV, applied at 25 to 30 lbs per 100 sq ft.
- Refer to published literature for each insulation and cover-board product for complete information related to limits and restrictions for asphalt adhesive application.
- To prevent calcination (the release of moisture from gypsum), and potential membrane blistering, SOPREMA® does not recommend encapsulating gypsum roof boards in hot asphalt. When gypsum roof boards are mopped in place using hot asphalt, the membrane base ply should not be asphalt-applied nor torch-applied. SOPREMA® recommends applying the membrane base ply using cold-applied adhesives, self-adhesive or mechanically fastened. Contact SOPREMA® for more information.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Ensure substrates are clean, dry and free of water, frost, ice. Ensure substrates are free of uncured/wet liquid primers and adhesives, oils, grease, incompatible contaminants, dirt, sand, loose substrate materials and other adverse substrate conditions that prevent adhesion.
- Ensure substrates are smooth and uniform before applying asphalt adhesive. Rough and irregular surfaces may require additional asphalt adhesive to achieve a sufficient adhesive bond.
- Where project substrate conditions are suspect, examine adhesion to ensure conditions are suitable before beginning the insulation adhesive application. Refer to Section 1.2 Insulation Adhesive Field Testing.
- Primer: Where required for substrates as indicated herein, prime the substrate before applying hot asphalt insulation adhesive. Primer options include:
    - ELASTOCOL™ 500 is a solvent-based primer used to improve adhesion between approved substrates and hot asphalt applied insulation and cover-boards.
    - ELASTOCOL™ 350 is a low VOC, polymer emulsion primer used to improve the adhesion between approved substrates and hot asphalt applied insulation and cover-boards.
- Apply a light, uniform application of primer using brush, roller, or sprayer at 0.35 to 0.60 gallon per 100 sq ft. Do not apply heavy or thick coats of primer.

Application:

- Examine the substrate before installing insulation and cover-boards in hot asphalt.
- Ensure primer is fully dry before applying hot asphalt. Primer should not transfer to finger tips when touched.
- Apply a full mopping of hot asphalt applied at 25 to 30 lbs per 100 sq ft.
- Immediately install boards into the hot asphalt while the asphalt temperature is approximately 400 °F (204 °C) when the boards are set in place.
- Apply uniform weight over the board to ensure each board is held in full contact with the hot asphalt.
- Hold uniform weight in place on the board until the asphalt has set/cooled sufficiently to hold the board firmly in place.

- When stepping boards in place, use caution to prevent hazards associated with boards sliding out of place and breaking the adhesive bond.
- Do not allow boards to lift and break contact with the hot asphalt. If the board breaks contact with the asphalt, the adhesive bond strength may be compromised.

Inspection:

- During application, inspect boards to ensure boards are flush with adjacent boards and other adjacent materials, to provide a uniform substate for the subsequent materials to be applied on the boards.
- Once the asphalt has cooled, inspect for loose/unadhered boards. Remove and replace or otherwise repair loose boards to ensure all boards are properly adhered.
- When project conditions are suspect, conduct adhesion tests as needed to demonstrate satisfactory adhesion is being achieved. Refer to Section 1.2 Insulation Adhesive Field Testing.

Table 5.2a Hot Asphalt Insulation Adhesive Substrates		
Adhesive	**ASTM D312 Type**	**Insulation Substrates**
Hot Asphalt	Type III, Type IV	Smooth-surfaced bitumen roofing plies and SBS modified bitumen roofing with sanded surfacing.
		Modified bitumen with granule surfacing. Prime granule surfacing with ELASTOCOL™ 500 or ELASTOCOL™ 350.
		SBS modified bitumen anchor sheets with sanded surfacing.
		Polyisocyanurate insulation boards. Refer to Section 3.1.
		Mineral wool insulation boards. Refer to Section 3.2.
		Gypsum thermal barrier and barrier boards. Refer to Section 2.1.
		Cement thermal barrier and barrier boards primed with ELASTOCOL™ 500 or ELASTOCOL™ 350 primer. Refer to Section 2.2.
		Concrete primed with ELASTOCOL™ 500 or ELASTOCOL™ 350 primer.

Contact SOPREMA® for other substrate options acceptable for asphalt insulation adhesive.

5.3 INSULATION MECHANICAL FASTENERS

General:

- Insulation fasteners are produced to attach roof insulation, cover-boards, thermal barriers and barrier boards to roof deck substrates.
- The insulation fasteners include screws or anchors and metal stress plates approved together as fastener assemblies. Refer to insulation fastener product information indicated below for specific product data.
- Insulation fasteners sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- The contractor and/or applicator is responsible for managing and controlling all exposures related to chemical hazards, toxic substances and odors. This includes personal protective equipment (PPE), administrative and work practice controls, and engineering controls. The contractor is responsible for the elimination or substitution of products as necessary to manage and control exposures related to chemical hazards, toxic substances and odors.
- Refer to product Safety Data Sheets (SDS) for health, safety, and environment related hazards, and take all necessary measures and precautions to comply with exposure requirements.

Preparation:

- Examine the roof deck to ensure the deck is satisfactory to install insulation fasteners.
- Where required for the project, conduct fastener withdrawal testing. Refer to Section 1.3 Insulation Fastener Withdrawal Field Testing.
- Refer to Table 5.3a below for fastener selection and substrate/deck type:
    - Steel Decks: Where required for agency approvals and wind uplift ratings, ensure the screw pattern is arranged to engage the top flange of the steel deck. Ensure the screws selected are of sufficient length to penetrate through the steel deck ¾ in minimum.
    - Wood Decks: Ensure the screws selected are of sufficient length to penetrate through plywood decks a minimum of ¾ in, and embed into wood plank decks a minimum of 1 in.
    - Concrete Decks: Ensure the fasteners selected are of sufficient length to embed into the concrete decks a minimum of 1 in. For each fastener type, refer to published requirements for pre-drilling requirements.
    - Gypsum Decks: Ensure the fasteners selected are of sufficient length to embed into the concrete deck a minimum of 2 in. Refer to published requirements.
    - Lightweight Insulating Concrete: Ensure the fasteners selected are of sufficient length to embed into the concrete deck a minimum of 2 in. Refer to published requirements.
- Refer to published fastener product information for each fastener type for installation equipment, equipment settings, bits and related information.

Application:

- Follow installation instructions for each fastener type. Use hyperlinks included herein to access fastener product information, or contact SOPREMA® for complete installation instructions and product data.
- Refer to Section 5.3.1, Section 5.3.2, Section 5.3.3, and Section 5.3.4 below for general fastening patterns offered for SOPREMA® warranty purposes only. Contact SOPREMA® for project-specific warranty requirements and project registration.
- Comply with project design requirements for insulation attachment. Refer to project design documents, specifications, agency approvals and jurisdictional codes to comply with fastening needed for each roof zone (the roof field, perimeter, and corner zones). Fastening requirements provided in this manual are for SOPREMA® warranty purposes only and are not offered as a substitution for roof design services.
- Lay-out the fasteners and stress plates on boards in a uniform pattern necessary to comply with attachment requirements. Refer to design documents for roof zones and install the appropriate number of fasteners per board to comply with project requirements for each roof zone. Refer to Figures 5a and 5b for roof zones dimensions.

- Select the appropriate fasteners for the substate and ensure the fastener length is long enough to engage the deck as indicated in the *Preparation* section above.
- While standing on the boards, apply uniform weight over the board to ensure each board is held in full contact with the deck substrate.
- Install the insulation fasteners vertically into the roof deck.
    - Steel and wood decks: Drive the fasteners home, flush with the metal stress plates and insulation board surface. Do not over-drive the fasteners, do not overstress or bend the insulation fastener stress plates.
    - Concrete Decks: Pre-drill pilot holes into the concrete using the required impact/hammer drill bits sized for the fastener, drilled to the required depth. Set fastener drivers and drills to ensure fasteners are not over-driven. Drive the fasteners home, flush with the metal stress plates and insulation board surface. Do not over-drive the fasteners, do not overstress or bend the insulation fastener stress plates.
    - Gypsum and lightweight insulating concrete: Set fastener drivers and drills to ensure fasteners are not over-driven. Drive the fasteners home, flush with the metal stress plates and insulation board surface. Do not over-drive the fasteners, and do not allow fasteners to "spin-out." Remove and replace all fasteners that "spin-out."
- Remove dust and debris from insulation.

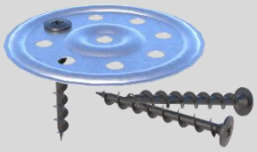
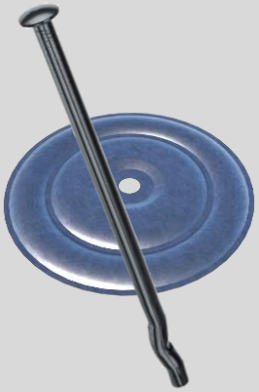
Inspection:

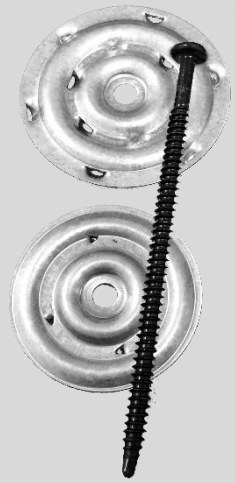
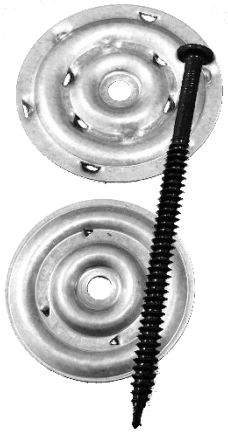
- Before and during fastener installation, inspect boards to ensure boards remain butted tight at joints and flush with adjacent boards and other adjacent materials.
- Inspect fasteners to ensure fasteners are not under-driven nor over-driven. Adjust or replace all improperly driven fasteners.
- Remove and replace all fasteners that "spin-out" or are otherwise improperly installed. Install new fasteners nearby in the adjacent area.

Table 5.3a Insulation Mechanical Fasteners			
Fastener	**Image**	**Insulation Board**	**Substrate**
SOPRAFIX #12 DP FASTENER with SOPRAFIX 3 IN STRESS PLATE		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All wood fiber cover-boards (Section 4.6)	Steel, Wood
SOPRAFIX® #14 MP FASTENER with SOPRAFIX 3 IN STRESS PLATE		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All wood fiber cover-boards (Section 4.6)	Steel, Wood, Concrete

Fastener	Image	Insulataion Board	Substrate
SOPRAFIX® #15 HD FASTENER with SOPRAFIX 3 IN STRESS PLATE		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All wood fiber cover-boards (Section 4.6)	Steel, Wood
SOPRAFIX® #12 DP FASTENER with SFS isoweld® Plate		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All high density polyisocyanurate cover-boards (Section 4.4), All wood fiber cover-boards (Section 4.6)	Steel, Wood
SOPRAFIX® #12 DP FASTENER with SENTINEL® Induction Weld Plate or Trufast PVC IW Plate			

Fastener	Image	Insulation Board	Substrate
SOPRAFIX® #14 MP FASTENER with SFS isoweld® Plate		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2),	Steel, Wood, Concrete
SOPRAFIX® #14 MP FASTENER with SENTINEL® Induction Weld Plate or Trufast PVC IW Plate		All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All high density polyisocyanurate cover-boards (Section 4.4), All wood fiber cover-boards (Section 4.6)	
SOPRAFIX® #15 HD FASTENER with SFS isoweld® Plate		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1),	
SOPRAFIX® #15 HD FASTENER with SENTINEL® Induction Weld Plate or Trufast PVC IW Plate		All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All high density polyisocyanurate cover-boards (Section 4.4), All wood fiber cover-boards (Section 4.6)	Steel, Wood

Fastener	Image	Insulation Board	Substrate
VERSA-FAST® FASTENERS with VERSA-FAST® METAL PLATES		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All wood fiber cover-boards (Section 4.6)	Cellular lightweight insulating concrete, Poured gypsum, Gypsum plank, Wood
CONCRETE SPIKE with SOPRAFIX 3 IN STRESS PLATE		All gypsum thermal barrier and barrier boards (Section 2.1), All cement thermal barrier and barrier boards (Section 2.2), All polyisocyanurate insulation boards (Section 3.1), All mineral wool insulation boards (Section 3.2), All SOPRABOARD™ asphaltic cover-boards (Section 4.1), All gypsum cover-boards (Section 4.2), All cement cover-boards (Section 4.3), All wood fiber cover-boards (Section 4.6)	Concrete

Fastener	Image	Insulation Board	Substrate
SOPRAFIX® #14 MP FASTENER with SOPRAFIX 2 IN STRESS PLATE or SOPRAFIX 2.4 IN STRESS PLATE		All SOPRASMART® laminated cover-boards (Section 4.5)	Steel, Wood, Concrete
SOPRAFIX® #15 HD FASTENER with SOPRAFIX 2 IN STRESS PLATE or SOPRAFIX 2.4 IN STRESS PLATE		All SOPRASMART® laminated cover-boards (Section 4.5)	Steel, Wood
CONCRETE SPIKE with SOPRAFIX 2 IN STRESS PLATE or SOPRAFIX 2.4 IN STRESS PLATE		All SOPRASMART® laminated cover-boards (Section 4.5)	Concrete

5.3.1 FOUR FEET BY FOUR FEET BOARD FASTENING PATTERNS

SOPREMA® insulation attachment guidelines and fastening patterns are offered by SOPREMA® to show the general fastener placement for SOPREMA® warranty purposes only. Guidance provided herein is not specific to any particular project's needs and is not a substitute for professional design services. SOPREMA® bears no liability nor responsibility for the evaluation or design of any particular project. The roofing contractor is responsible for ensuring compliance with contract documents, project specifications, roofing industry standards and jurisdictional codes necessary to meet the requirements for specific project applications.

For the figures below that indicate fastening patterns required for roof zones, refer to Figures 5a and 5b for the roof zone dimensions. Roof zone dimensions are offered for SOPREMA® warranty purposes only.

PRELIMINARY FASTENING PATTERN

- ACTUAL ONE (1) FASTENER PER 4 SQUARE FEET
- FOUR (4) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

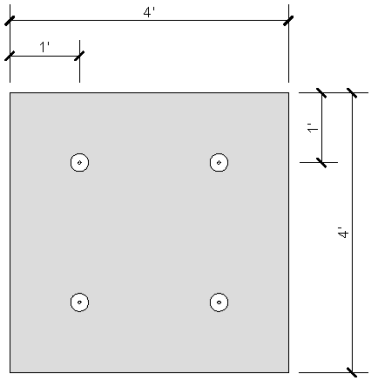
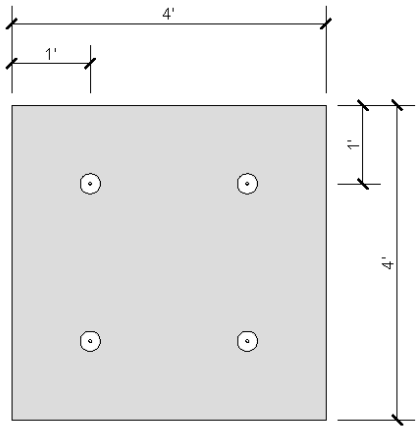


Figure 5.3.1a Four Feet by Four Feet Board, Mechanically Fastened, Preliminary Fastening Pattern

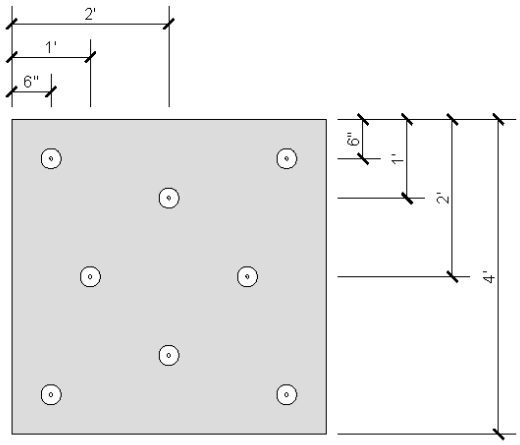
ZONE 1

- ACTUAL ONE (1) FASTENER PER 4 SQUARE FEET
- FOUR (4) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- EIGHT (8) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

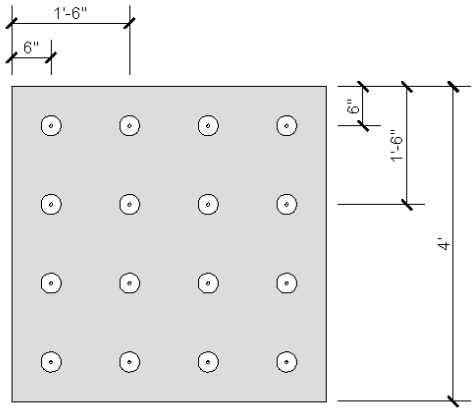
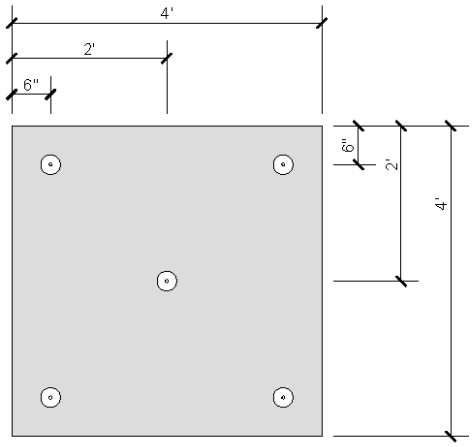


Figure 5.3.1b Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 4 Square Feet Fastening Pattern

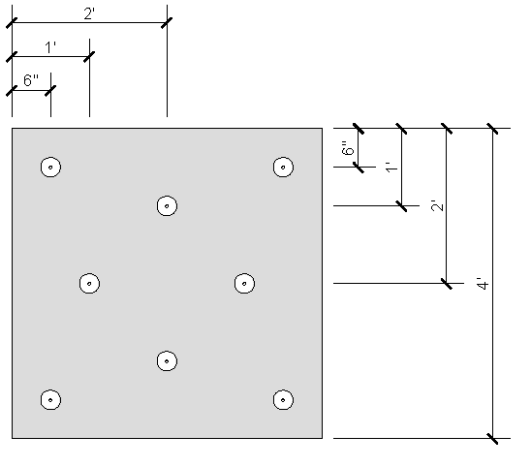
ZONE 1

- ACTUAL ONE (1) FASTENER PER 3.2 SQUARE FEET
- FIVE (5) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- EIGHT (8) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

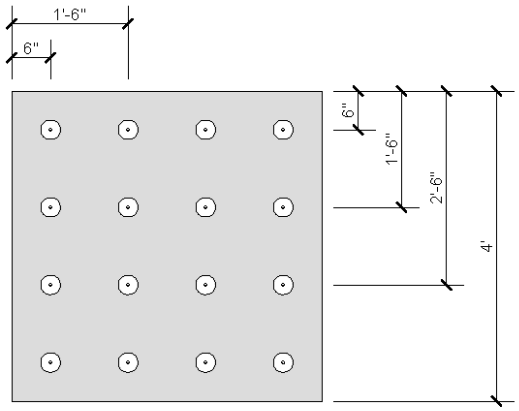
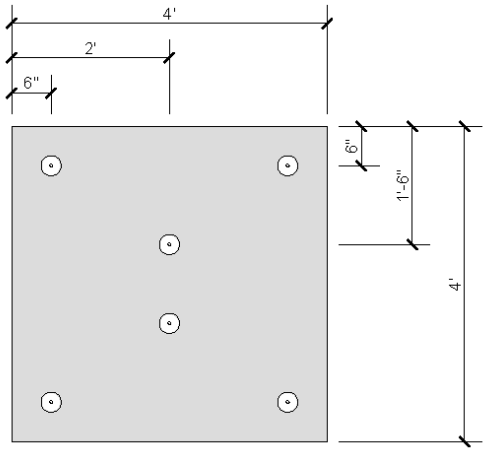


Figure 5.3.1c Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 3.2 Square Feet Fastening Pattern

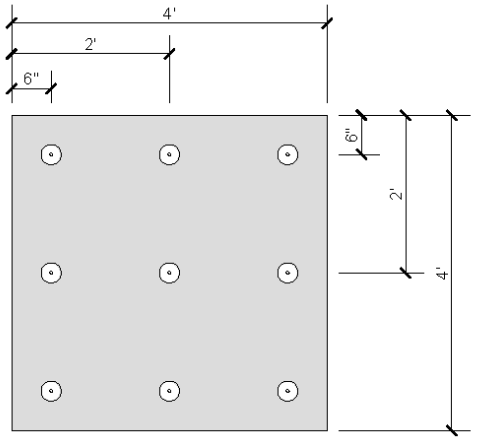
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.67 SQUARE FEET
- SIX (6) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.78 SQUARE FEET
- NINE (9) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

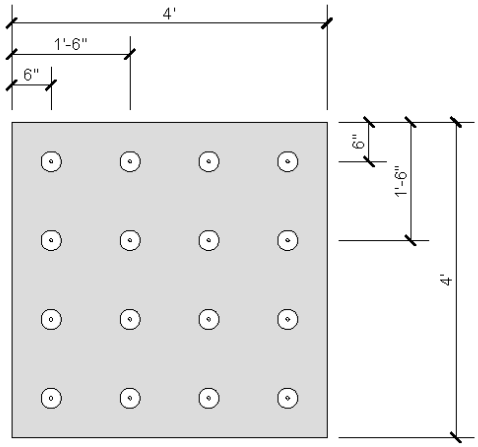
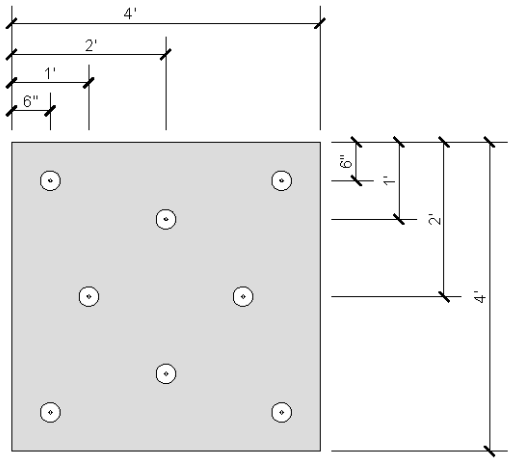


Figure 5.3.1d Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 2.67 Square Feet Fastening Pattern

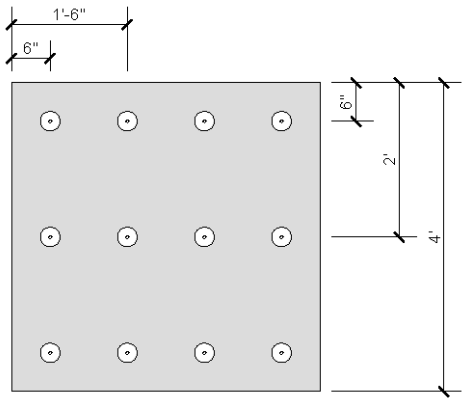
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- EIGHT (8) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- TWELVE (12) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

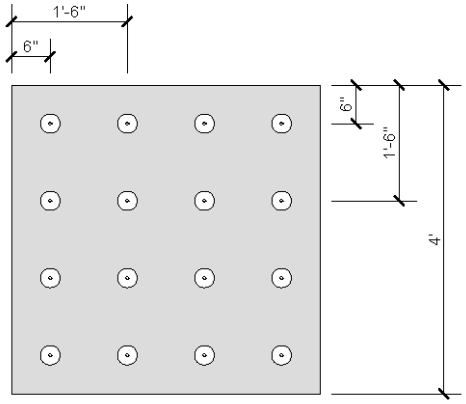


Figure 5.3.1e Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 2.6, 2.3 and 2 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.78 SQUARE FEET
- NINE (9) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACUTAL ONE (1) FASTENER PER 1.14 SQUARE FEET
- FOURTEEN (14) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

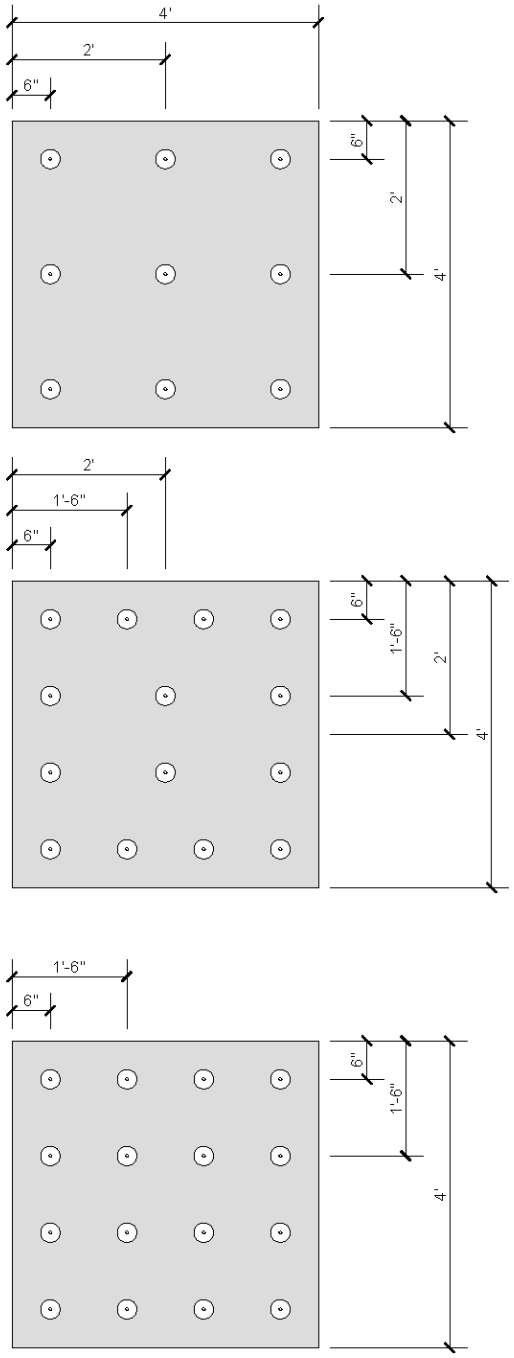
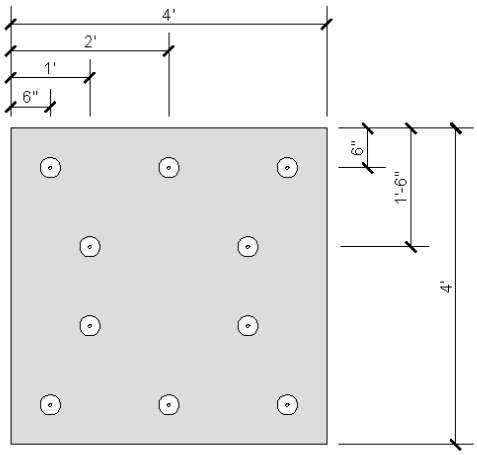


Figure 5.3.1f Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1.78 Square Feet Fastening Pattern

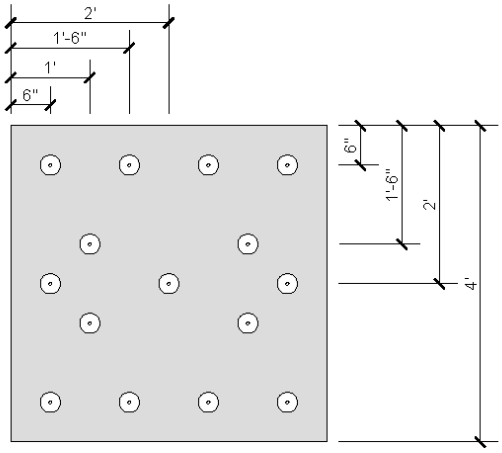
ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.6 SQUARE FEET
- TEN (10) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.07 SQUARE FEET
- FIFTEEN (15) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

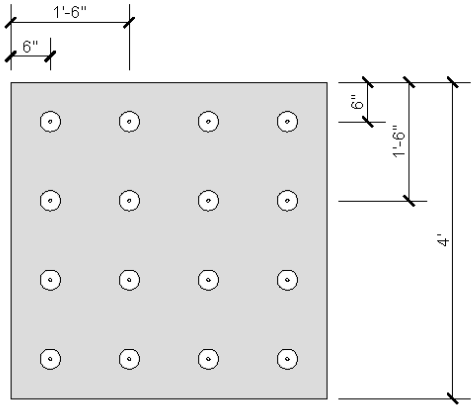
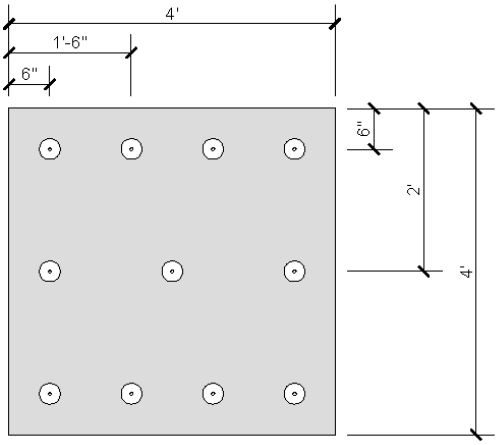


Figure 5.3.1g Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1.6 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.45 SQUARE FEET
- ELEVEN (11) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

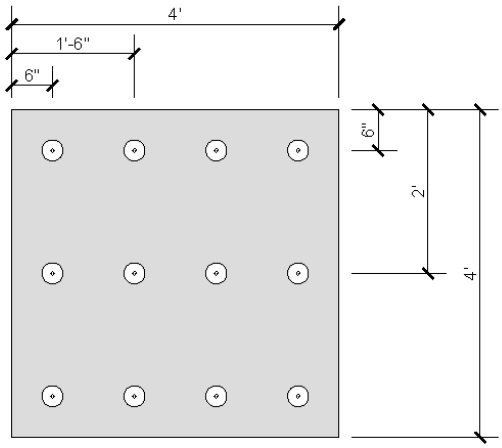
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.1h Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1.45 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- TWELVE (12) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

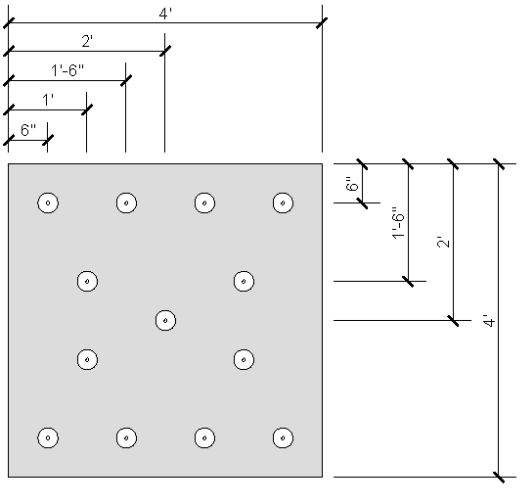
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.1i Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1.33 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.3 SQUARE FEET
- THIRTEEN (13) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

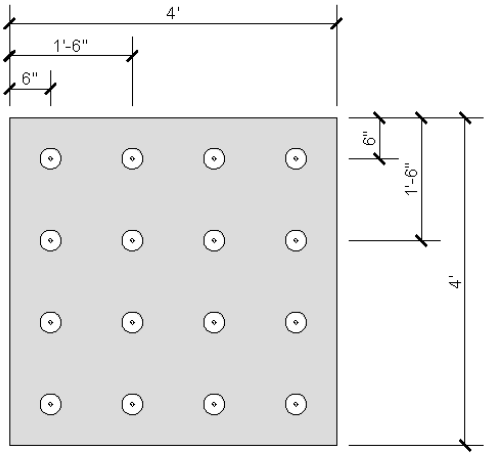
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.1j Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1.3 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

ZONE 3

- PRESCRIPTIVE ENHANCEMENT IS MORE THAN ONE (1) FASTENER PER 1 SQUARE FEET
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.1k Four Feet by Four Feet Board, Mechanically Fastened, 1 Fastener Per 1 Square Feet Fastening Pattern

5.3.2 FOUR FEET BY EIGHT FEET BOARD FASTENING PATTERNS

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For the figures below that indicate fastening patterns required for roof zones, refer to Figures 5a and 5b for the roof zone dimensions. Roof zone dimensions are offered for SOPREMA® warranty purposes only.

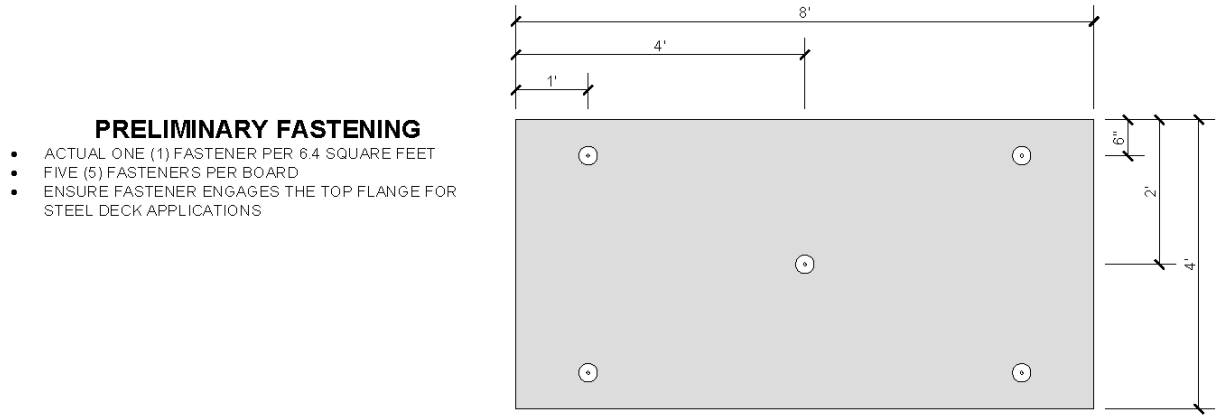


Figure 5.3.2a Four Feet by Eight Feet Board, Mechanically Fastened, Preliminary Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 4 SQUARE FEET
- EIGHT (8) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

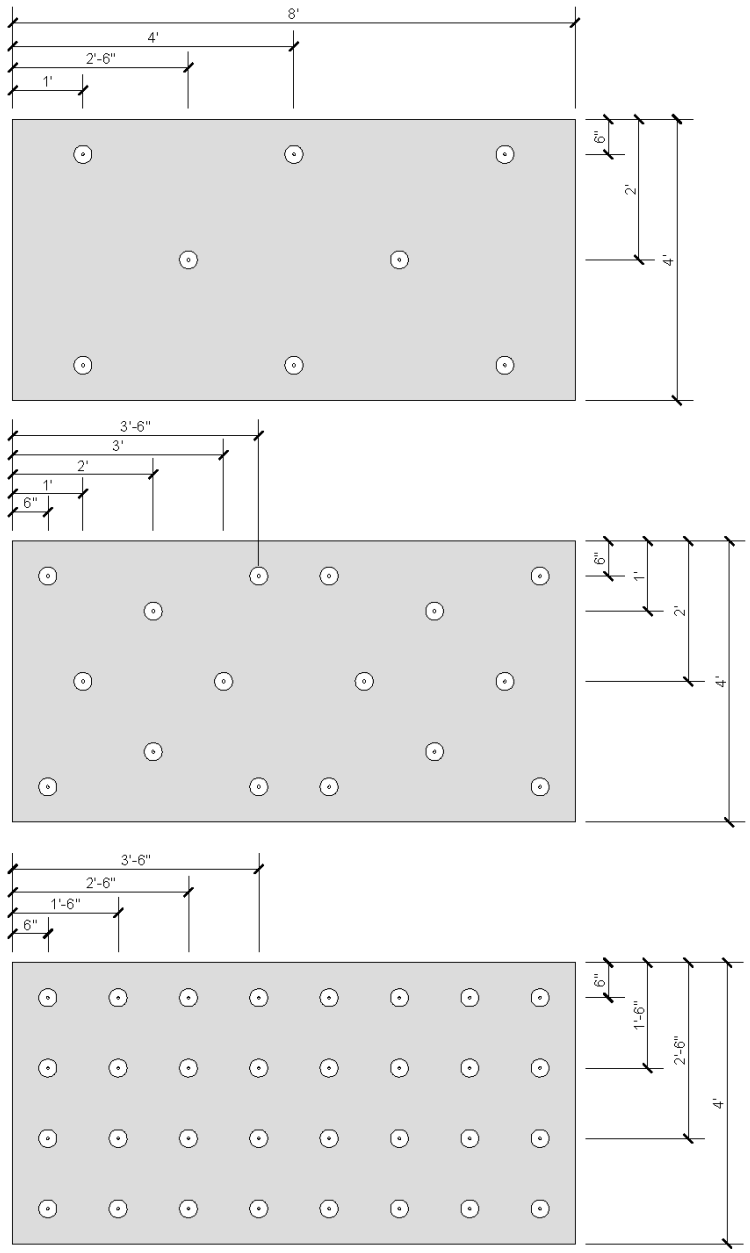


Figure 5.3.2b Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 4 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 3.2 SQUARE FEET
- TEN (10) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

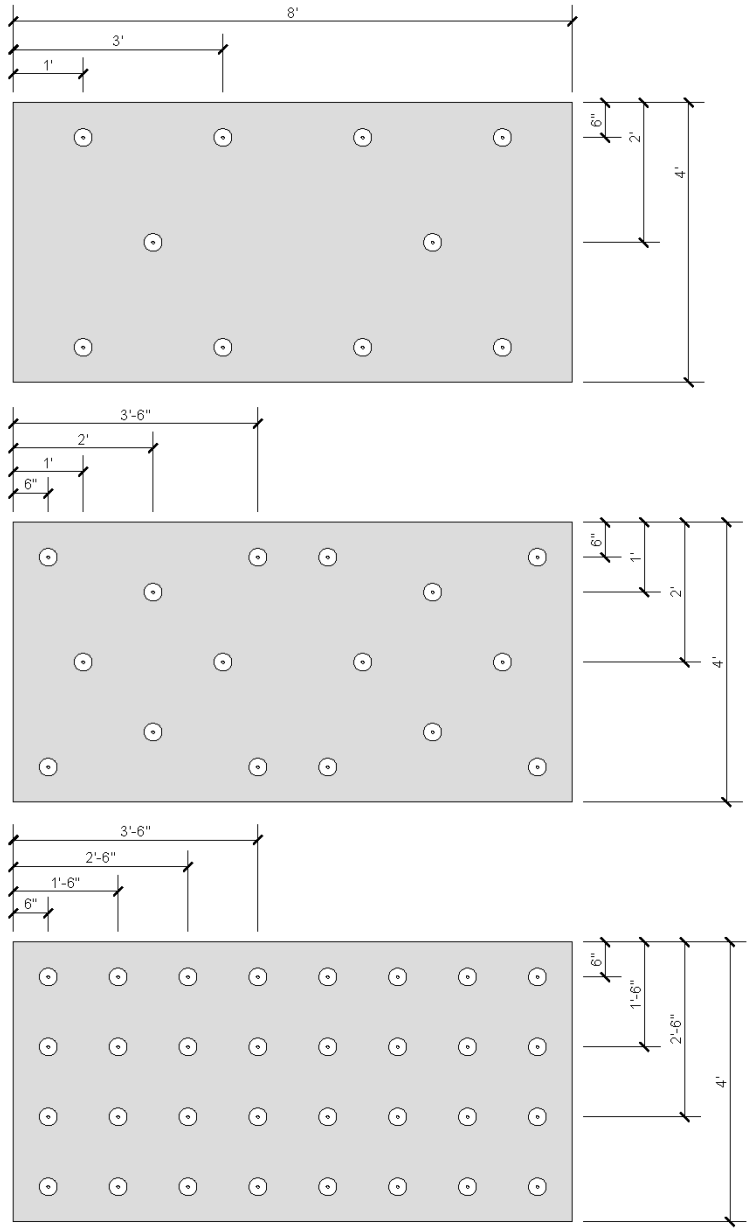
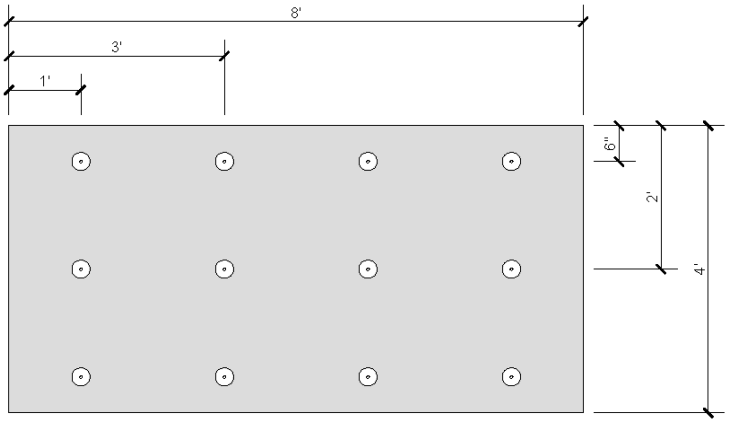


Figure 5.3.2c Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 3.2 Square Feet Fastening Pattern

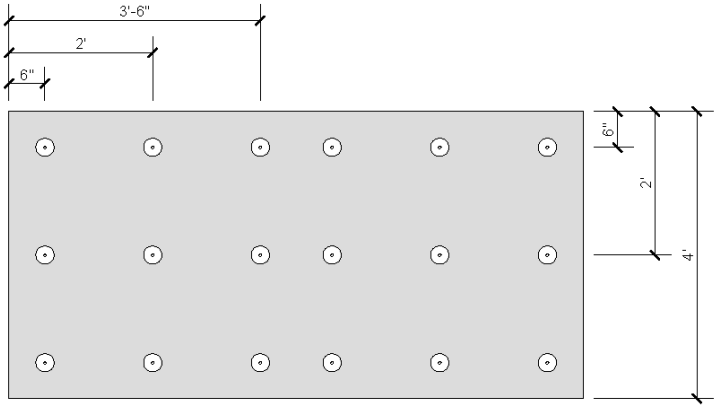
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.67 SQUARE FEET
- TWELVE (12) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.78 SQUARE FEET
- EIGHTEEN (18) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

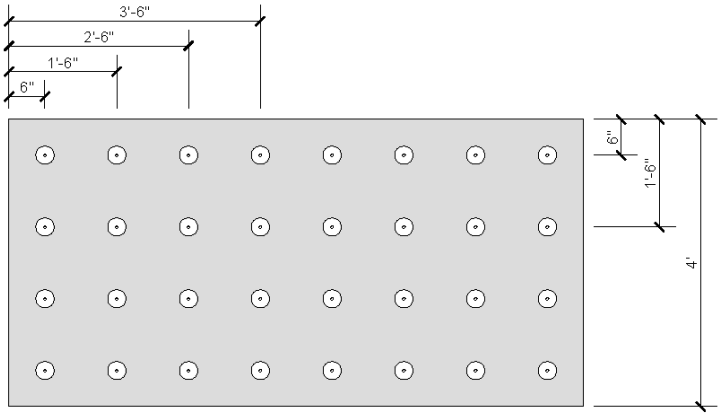


Figure 5.3.2d Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 2.67 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.6 SQUARE FEET
- THIRTEEN (13) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.6 SQUARE FEET
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

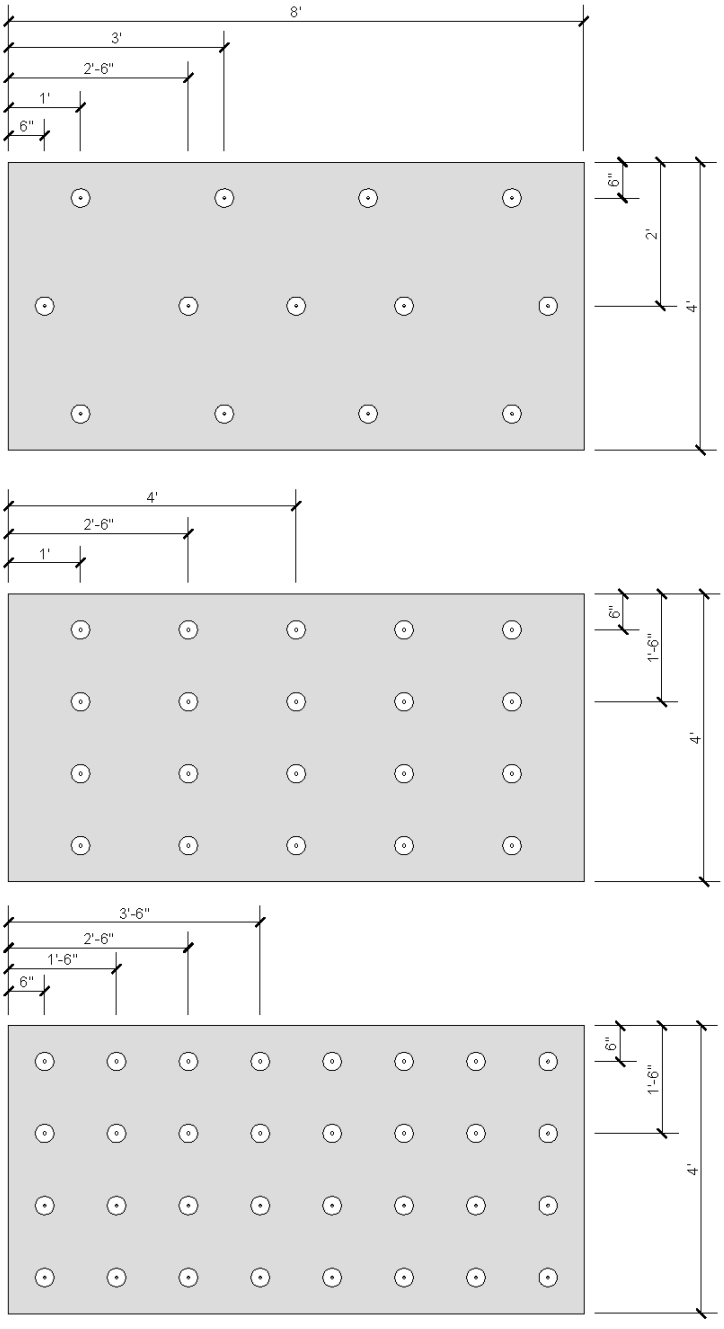


Figure 5.3.2e Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 2.6 Square Feet Fastening Pattern

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ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.3 SQUARE FEET
- FOURTEEN (14) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.52 SQUARE FEET
- TWENTY ONE (21) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

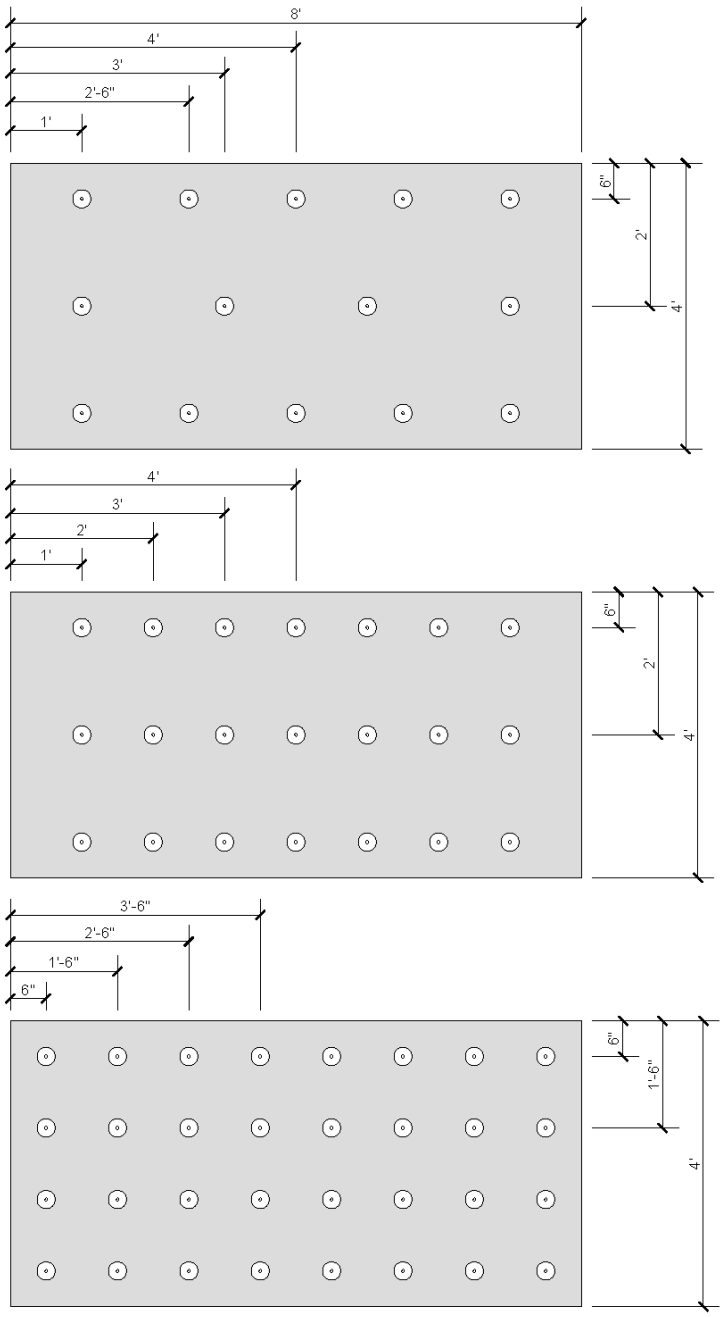

Figure 5.3.2f Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 2.3 Square Feet Fastening Pattern

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ZONE 1

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- TWENTY FOUR (24) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

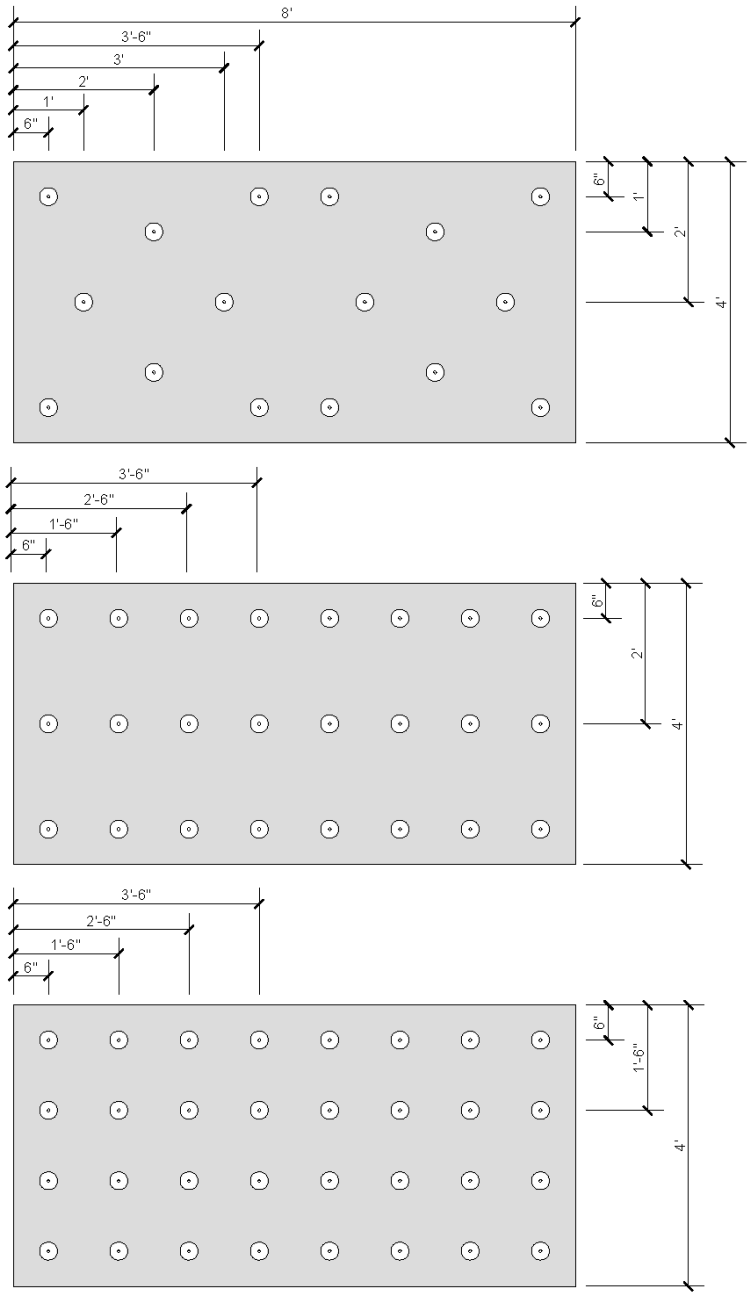

Figure 5.3.2g Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 2 Square Feet Fastening Pattern

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ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.78 SQUARE FEET
- EIGHTEEN (18) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.19 SQUARE FEET
- TWENTY SEVEN (27) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

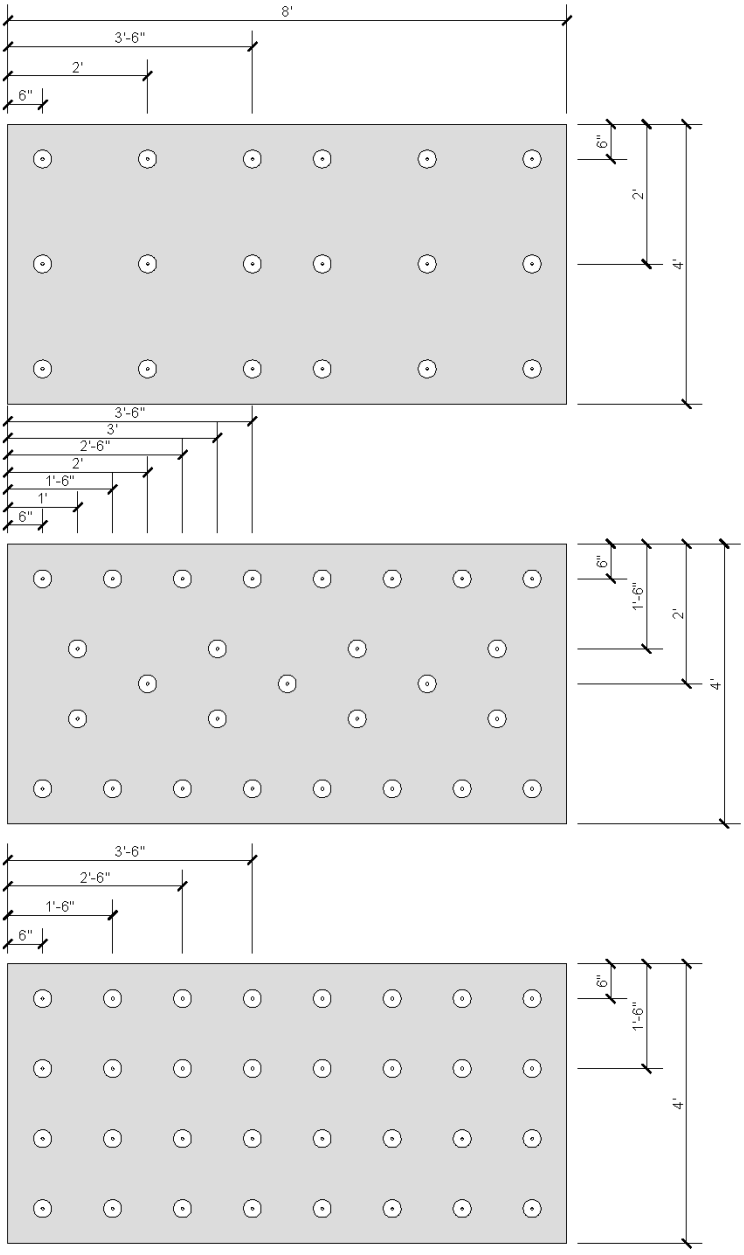

Figure 5.3.2h Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1.78 Square Feet Fastening Pattern

ZONE 1

- ONE (1) FASTENER PER 1.6 SQUARE FEET
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.07 SQUARE FEET
- THIRTY (30) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

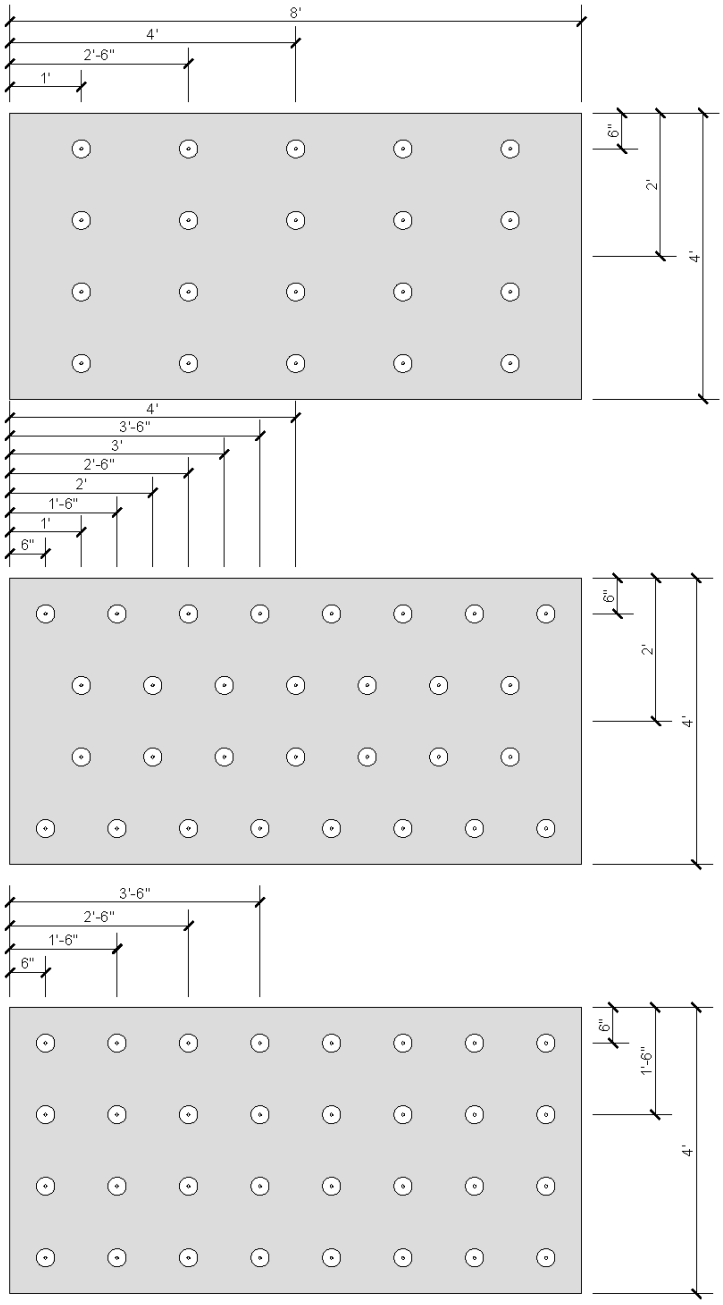

Figure 5.3.2i Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1.6 Square Feet Fastening Pattern

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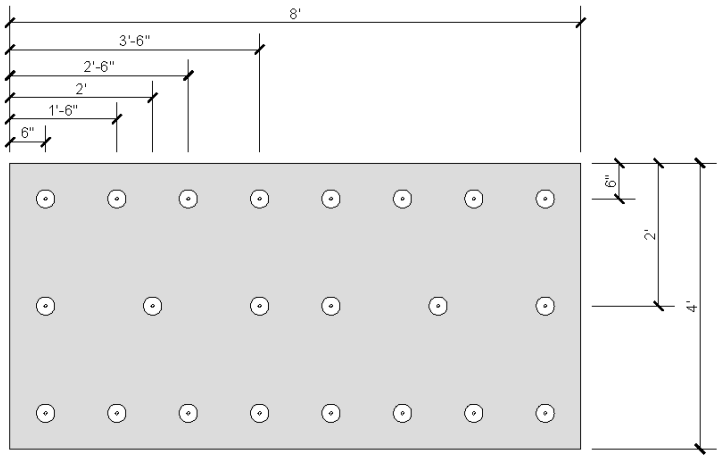
ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.45 SQUARE FEET
- TWENTY TWO (22) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

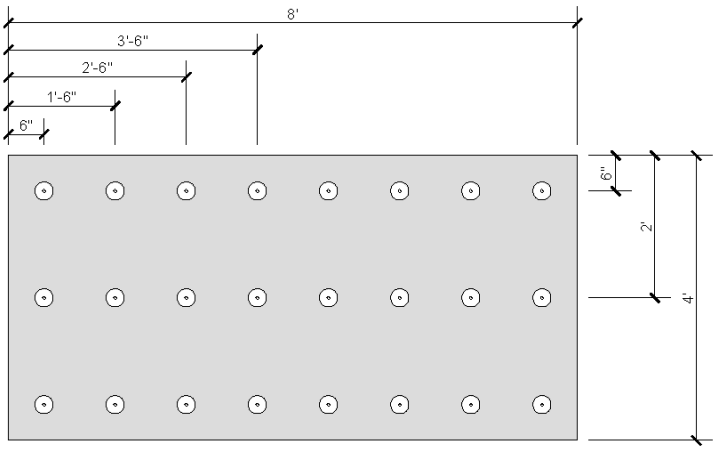
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED BASE PLY SYSTEMS OR RIBBON ADHERED BOARDS FOR SOPREMA WARRANTY PURPOSES.
- CONSULT WITH SOPREMA TECHNICAL SUPPORT FOR FURTHER INFORMATION.

Figure 5.3.2j Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1.45 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- TWENTY FOUR (24) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

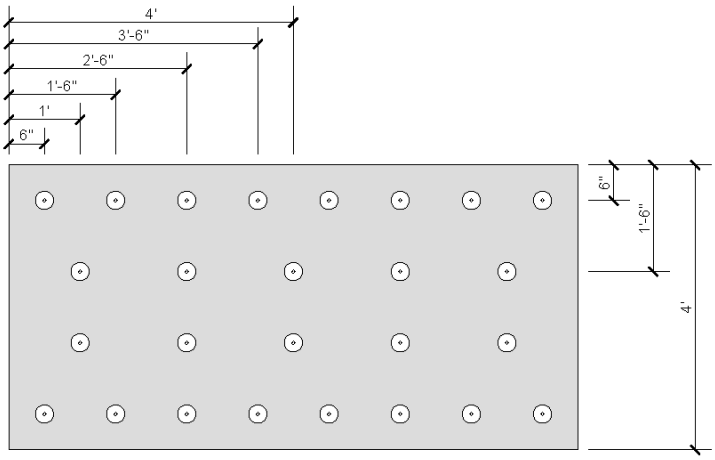
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED BASE PLY SYSTEMS OR RIBBON ADHERED BOARDS FOR SOPREMA WARRANTY PURPOSES.
- CONSULT WITH SOPREMA TECHNICAL SUPPORT FOR FURTHER INFORMATION.

Figure 5.3.2k Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1.33 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.23 SQUARE FEET
- TWENTY SIX (26) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

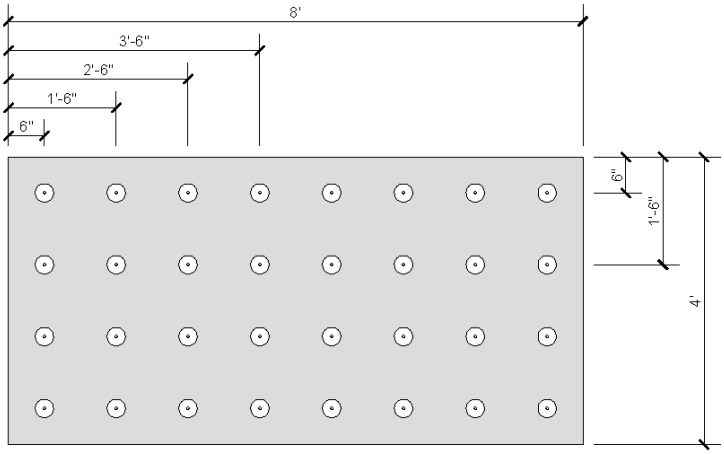
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED BASE PLY SYSTEMS OR RIBBON ADHERED BOARDS FOR SOPREMA WARRANTY PURPOSES.
- CONSULT WITH SOPREMA TECHNICAL SUPPORT FOR FURTHER INFORMATION.

Figure 5.3.2l Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1.3 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- THIRTY TWO (32) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED BASE PLY SYSTEMS OR RIBBON ADHERED BOARDS FOR SOPREMA WARRANTY PURPOSES.
- CONSULT WITH SOPREMA TECHNICAL SUPPORT FOR FURTHER INFORMATION.

Figure 5.3.2m Four Feet by Eight Feet Board, Mechanically Fastened, 1 Fastener Per 1 Square Feet Fastening Pattern

5.3.3 FOUR FEET BY FIVE FEET BOARD FASTENING PATTERNS

SOPREMA® insulation attachment guidelines and fastening patterns are offered by SOPREMA® to show the general fastener placement for SOPREMA® warranty purposes only. Guidance provided herein is not specific to any particular project's needs and is not a substitute for professional design services. SOPREMA® bears no liability nor responsibility for the evaluation or design of any particular project. The roofing contractor is responsible for ensuring compliance with contract documents, project specifications, roofing industry standards and jurisdictional codes necessary to meet the requirements for specific project applications.

For the figures below that indicate fastening patterns required for roof zones, refer to Figures 5a and 5b for the roof zone dimensions. Roof zone dimensions are offered for SOPREMA® warranty purposes only.

PRELIMINARY FASTENING

- ACTUAL ONE (1) FASTENER PER 5 SQUARE FEET
- FOUR (4) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

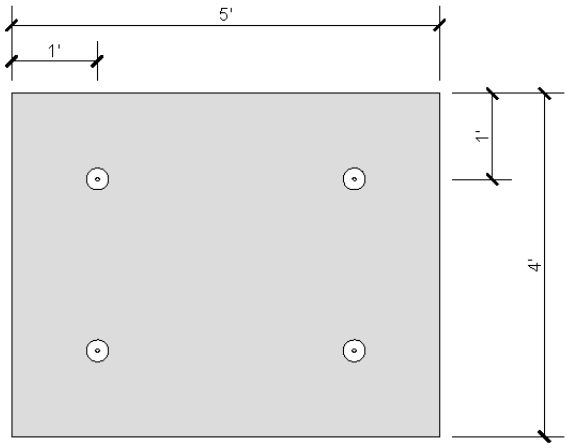
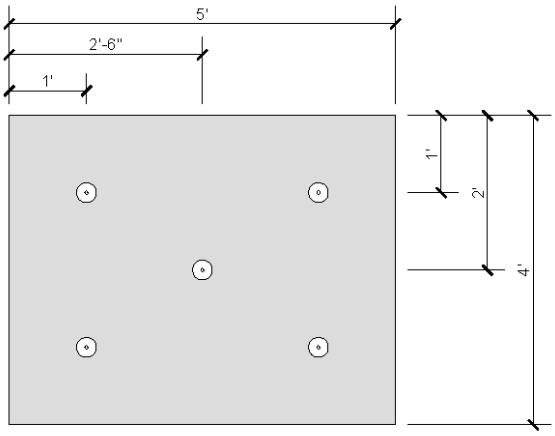


Figure 5.3.3a Four Feet by Five Feet Board, Mechanically Fastened, Preliminary Fastening Pattern

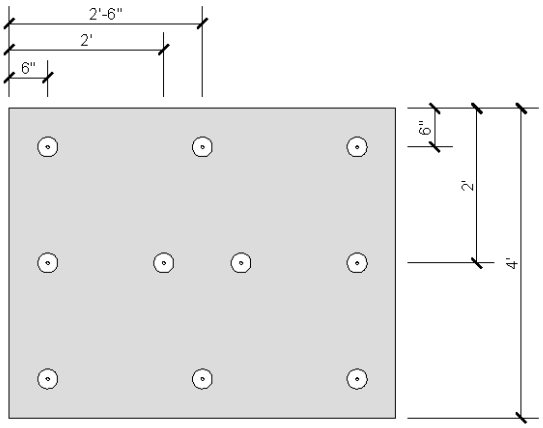
ZONE 1

- ACTUAL ONE (1) FASTENER PER 4 SQUARE FEET
- FIVE (5) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- TEN (10) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

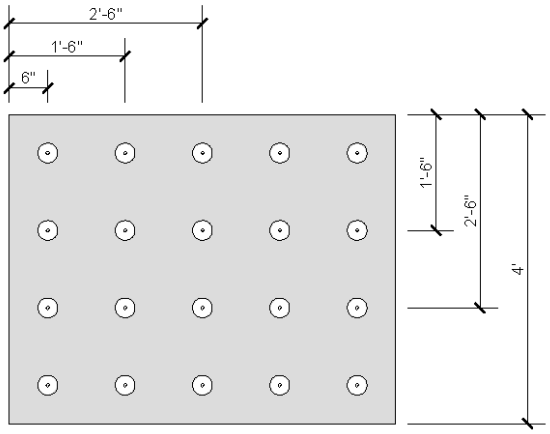
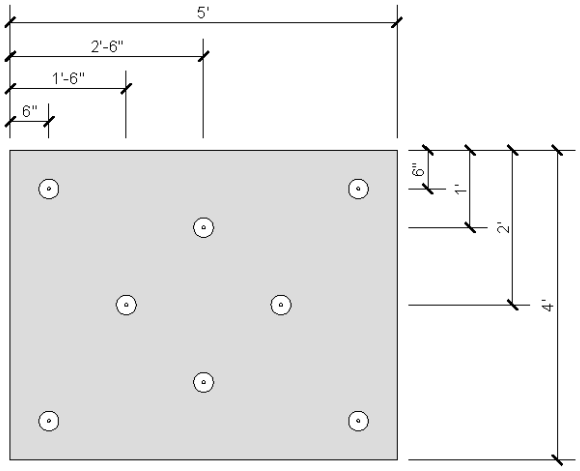


Figure 5.3.3b Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 4 Square Feet Fastening Pattern

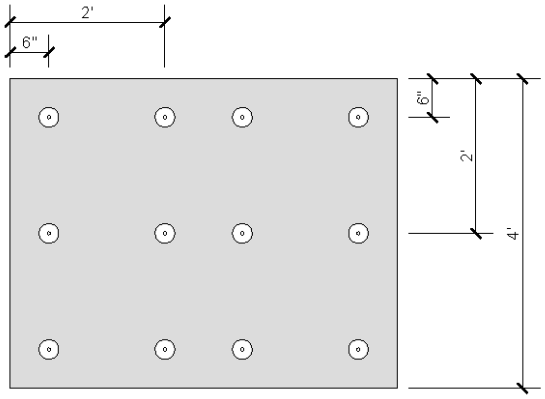
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.5 SQUARE FEET
- EIGHT (8) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.67 SQUARE FEET
- TWELVE (12) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

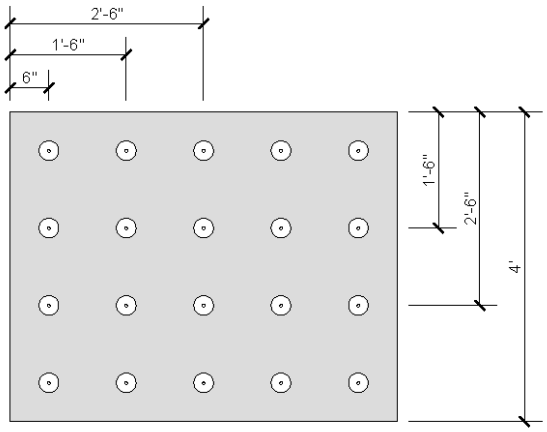
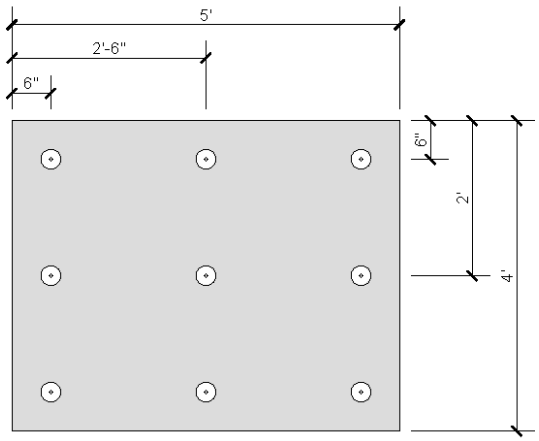


Figure 5.3.3c Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 3.2, 2.67 and 2.6 Square Feet Fastening Pattern

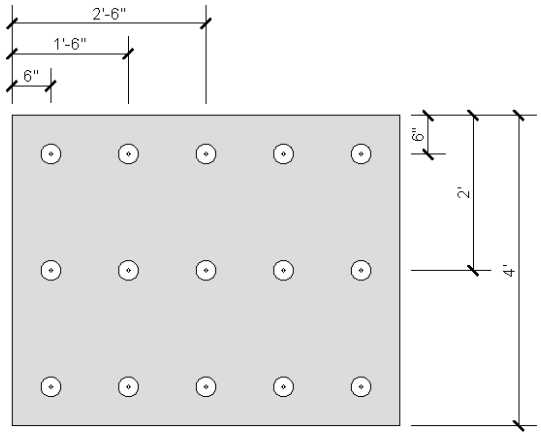
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2.22 SQUARE FEET
- NINE (9) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- FIFTEEN (15) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

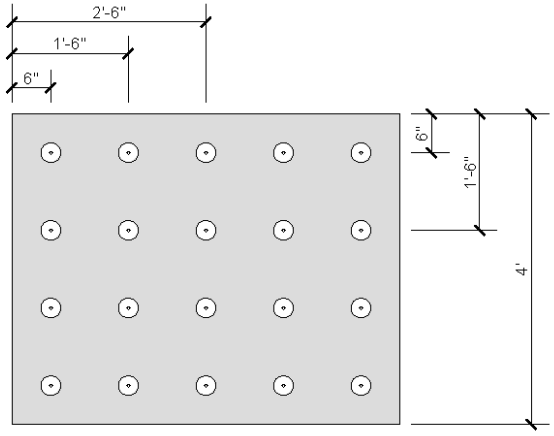
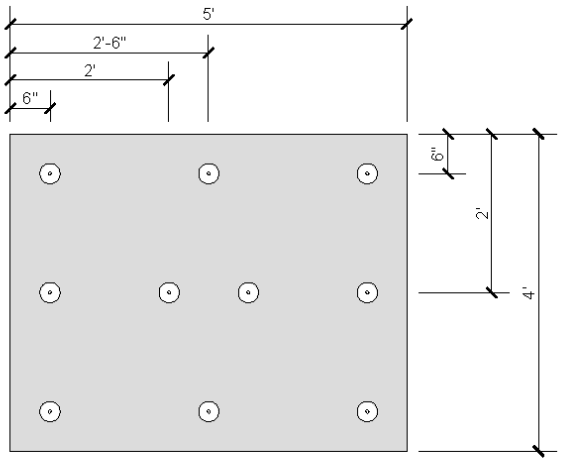


Figure 5.3.3d Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 2.3 Square Feet Fastening Pattern

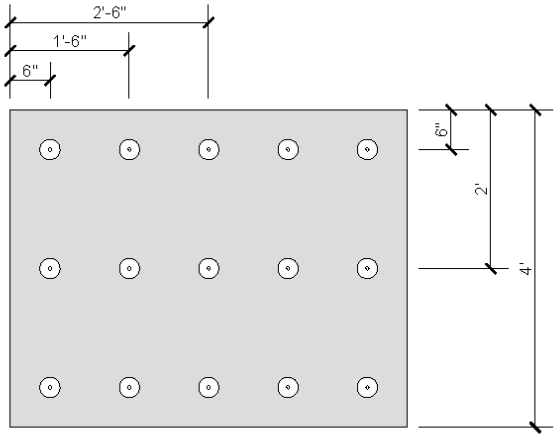
ZONE 1

- ACTUAL ONE (1) FASTENER PER 2 SQUARE FEET
- TEN (10) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.33 SQUARE FEET
- FIFTEEN (15) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

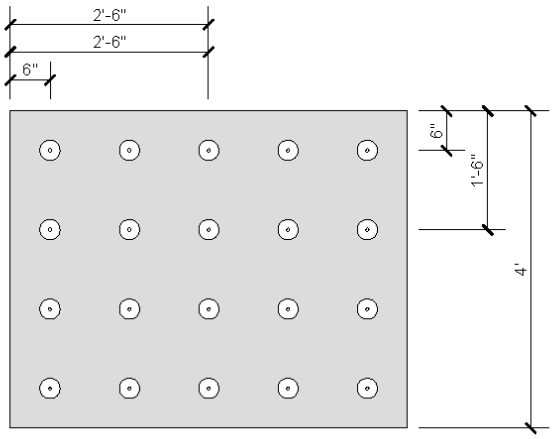


Figure 5.3.3e Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 2 Square Feet Fastening Pattern

ZONE 1

- ACTUAL ONE (1) FASTENER PER 1.67 SQUARE FEET
- TWELVE (12) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 2

- ACTUAL ONE (1) FASTENER PER 1.11 SQUARE FEET
- EIGHTEEN (18) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

ZONE 3

- ACTUAL ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS

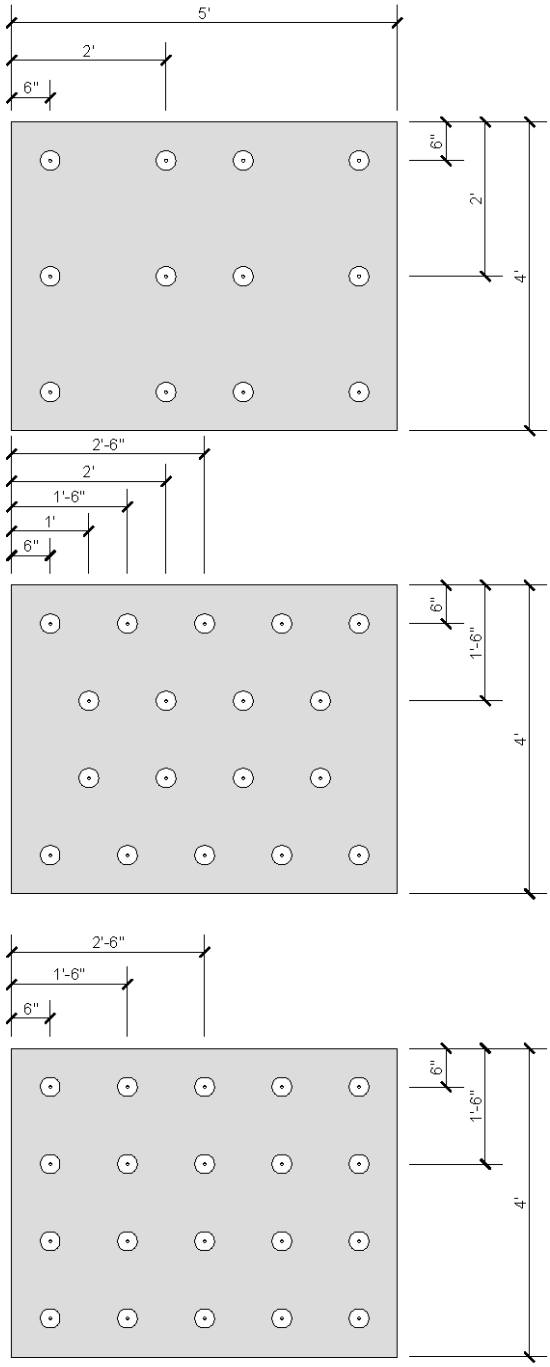
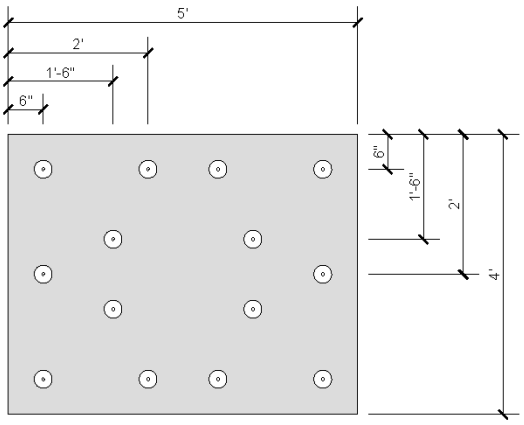


Figure 5.3.3f Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 1.78 Square Feet Fastening Pattern

ZONE 1

- ONE (1) FASTENER PER 1.43 SQUARE FEET
- FOURTEEN (14) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

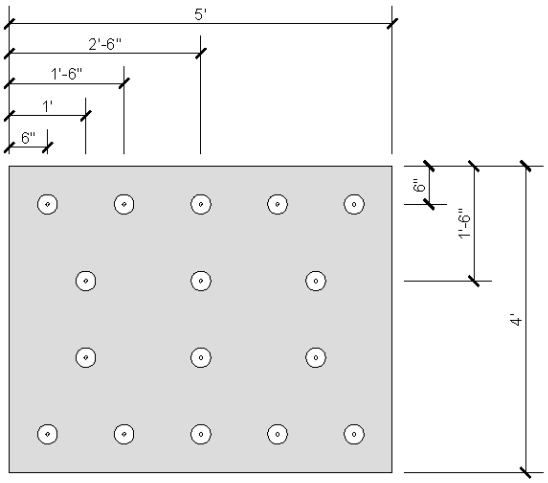
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.3g Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 1.6 And 1.45 Square Feet Fastening Pattern

ZONE 1

- ONE (1) FASTENER PER 1.25 SQUARE FEET
- SIXTEEN (16) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

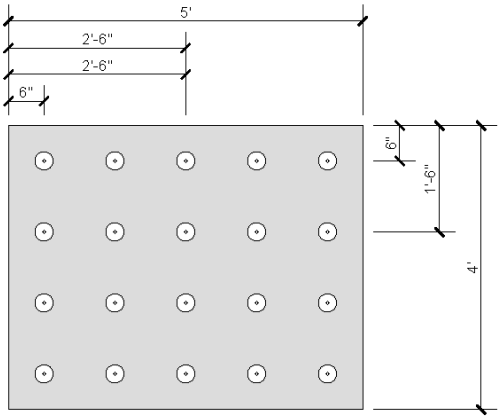
ZONE 3

- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.3h Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 1.33 and 1.3 Square Feet Fastening Pattern

ZONE 1

- ONE (1) FASTENER PER 1 SQUARE FOOT
- TWENTY (20) FASTENERS PER BOARD
- ENSURE FASTENER ENGAGES THE TOP FLANGE FOR STEEL DECK APPLICATIONS



ZONE 2

- PRESCRIPTIVE ENHANCEMENT WILL REQUIRE MORE THAN ONE (1) FASTENER PER 1 SQUARE FOOT
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR PERIMETER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

ZONE 3

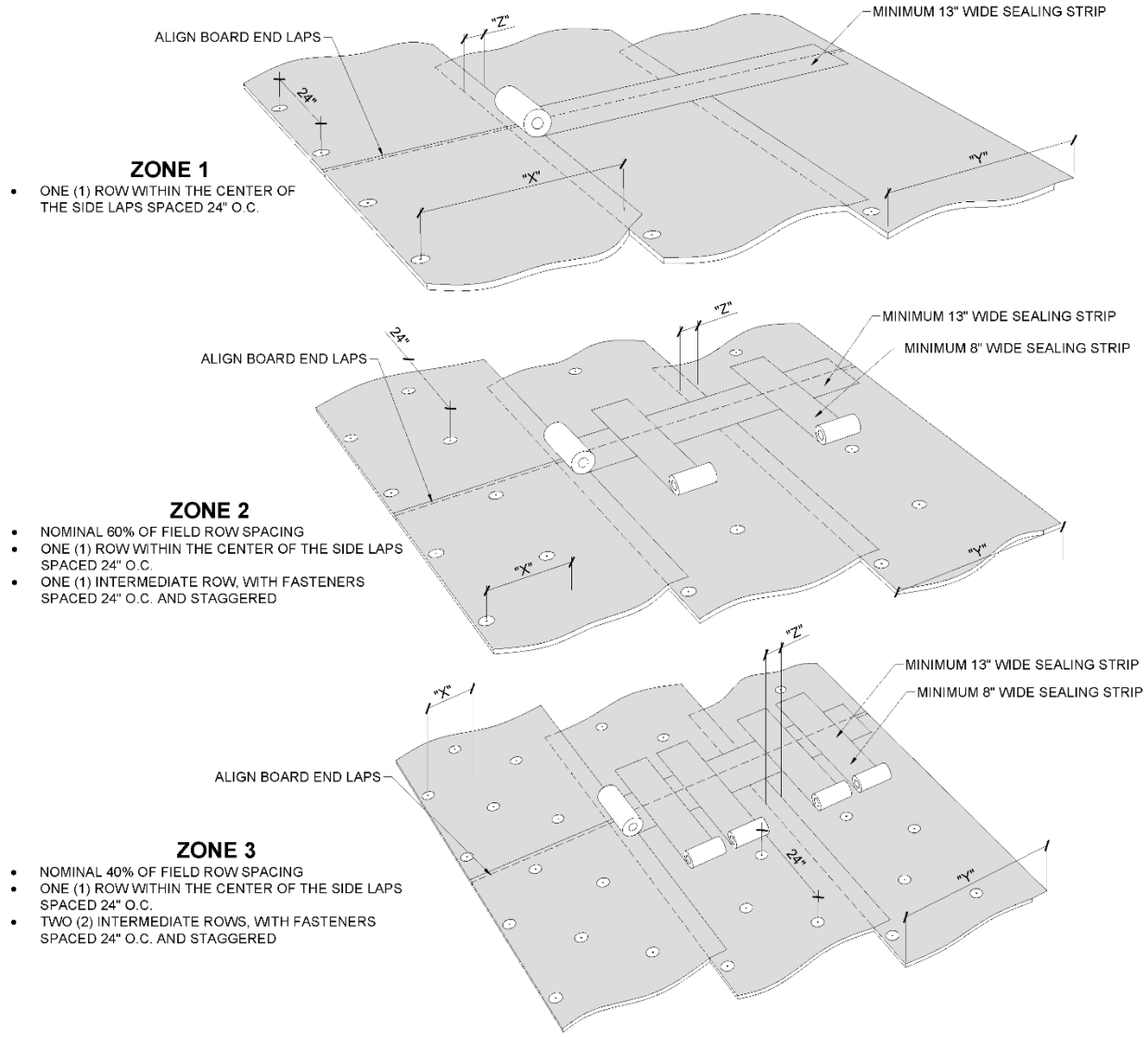
- ALTERNATE ATTACHMENT METHODS SHOULD BE CONSIDERED FOR CORNER ENHANCEMENTS SUCH AS MECHANICALLY ATTACHED MEMBRANE SYSTEMS
- CONTACT SOPREMA TECHNICAL SUPPORT FOR ADDITIONAL INFORMATION.

Figure 5.3.3i Four Feet by Five Feet Board, Mechanically Fastened, 1 Fastener Per 1 Square Feet Fastening Pattern

5.3.4 SBS MODIFIED BITUMEN LAMINATED COVER-BOARD FASTENING PATTERNS

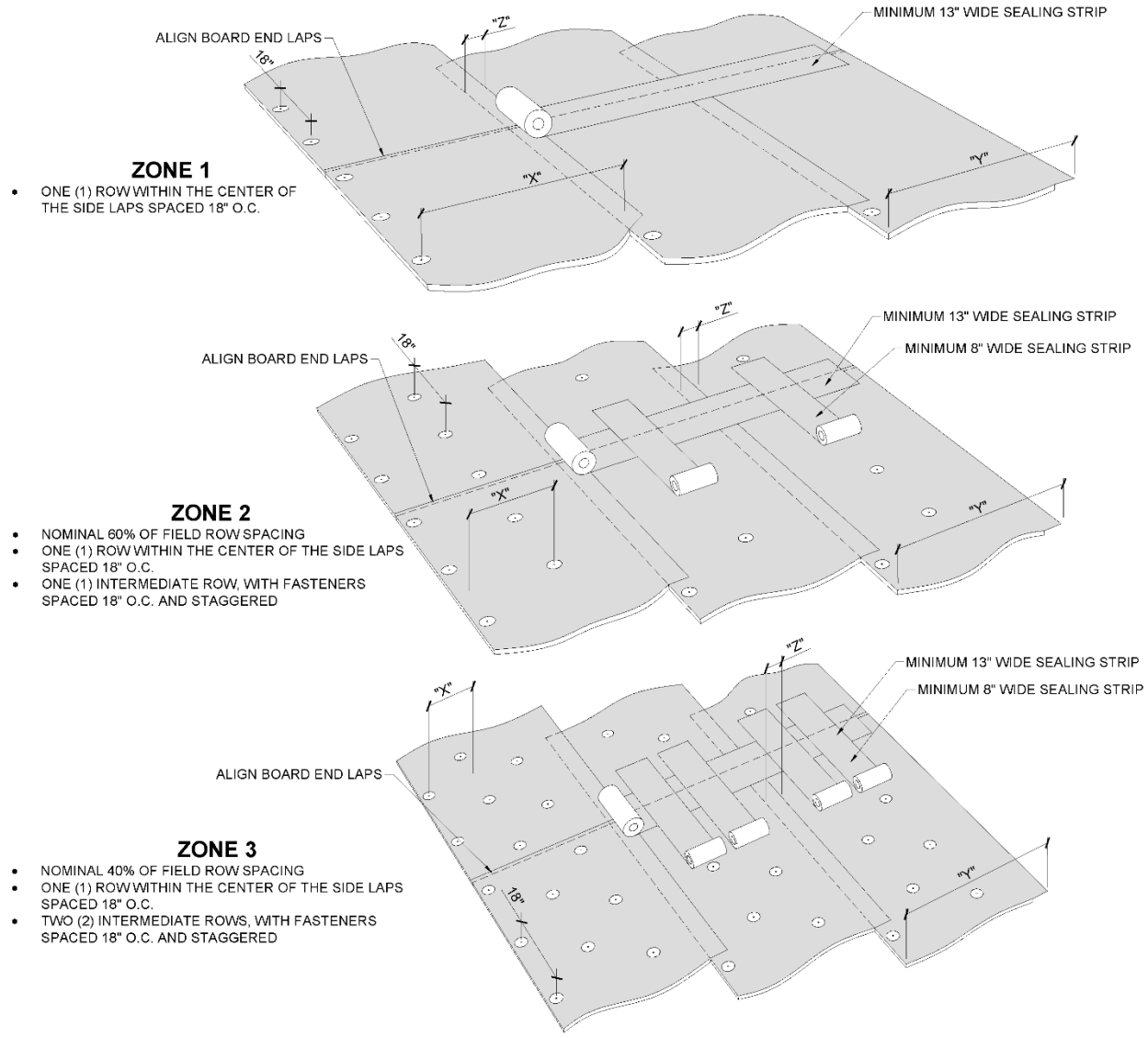
SOPREMA® insulation attachment guidelines and fastening patterns are offered by SOPREMA® to show the general fastener placement for SOPREMA® warranty purposes only. Guidance provided herein is not specific to any particular project's needs and is not a substitute for professional design services. SOPREMA® bears no liability nor responsibility for the evaluation or design of any particular project. The roofing contractor is responsible for ensuring compliance with contract documents, project specifications, roofing industry standards and jurisdictional codes necessary to meet the requirements for specific project applications.

For the figures below that indicate fastening patterns required for roof zones, refer to Figures 5a and 5b for the roof zone dimensions. Roof zone dimensions are offered for SOPREMA® warranty purposes only.



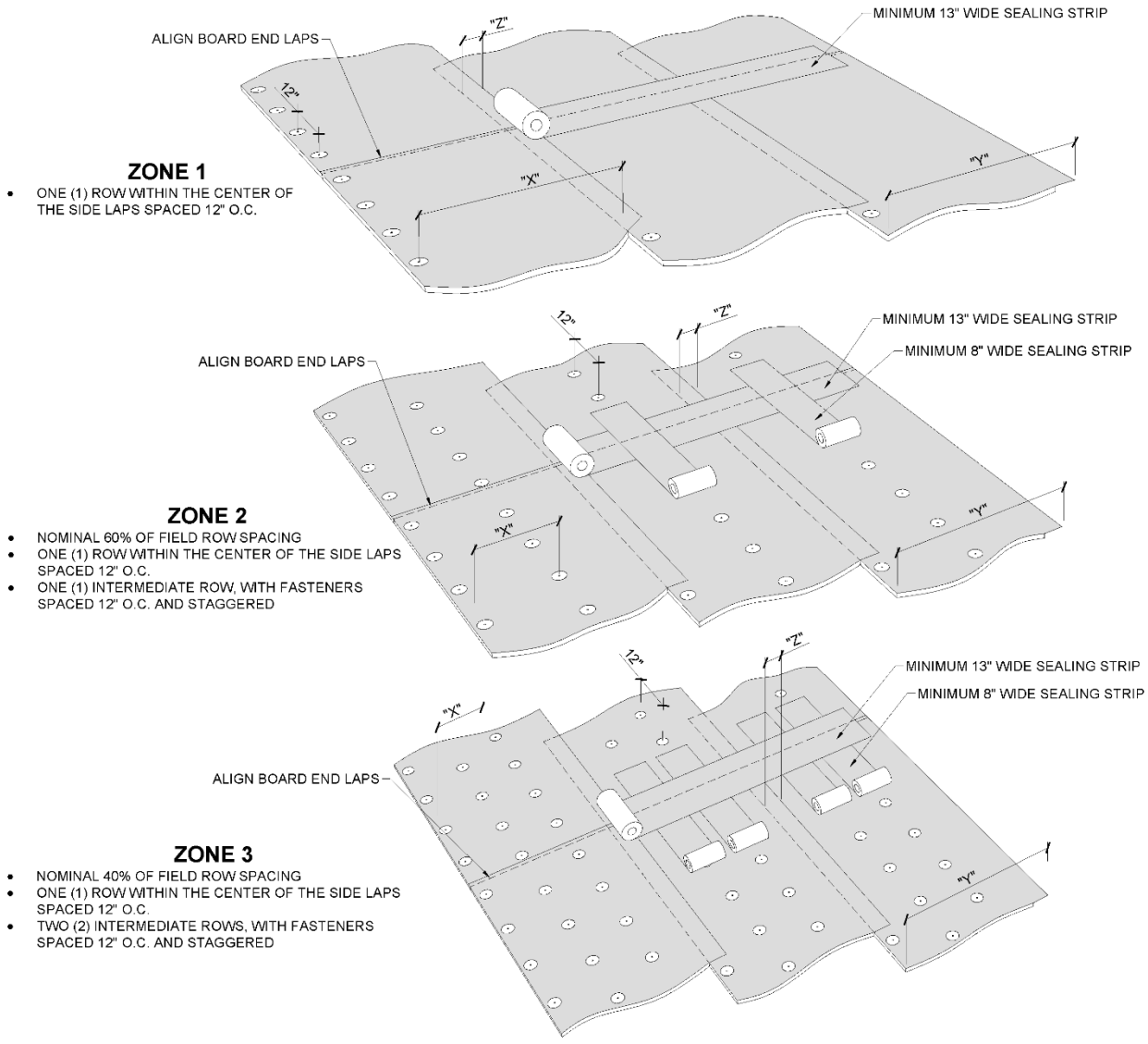
Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	24	36in	17
		2	24,24	18in	34
		3	24,24,24	12in	50

Figure 5.3.4a SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 24 in O.C. In Lap Fastening Pattern



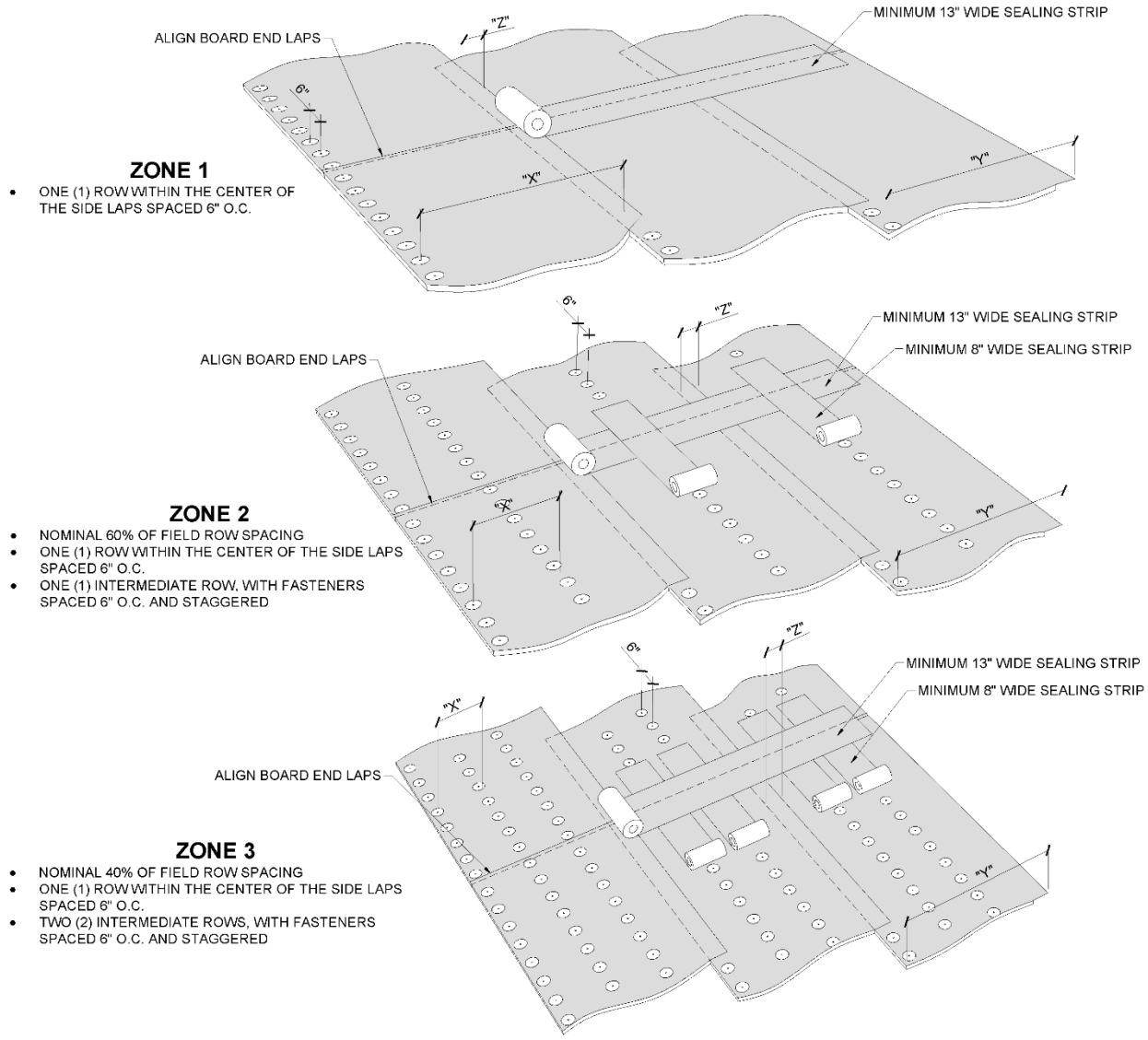
Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	18	36in	23
		2	18,18	18in	45
		3	18,18,18	12in	67

Figure 5.3.4b SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 18 in O.C. In Lap Fastening Pattern



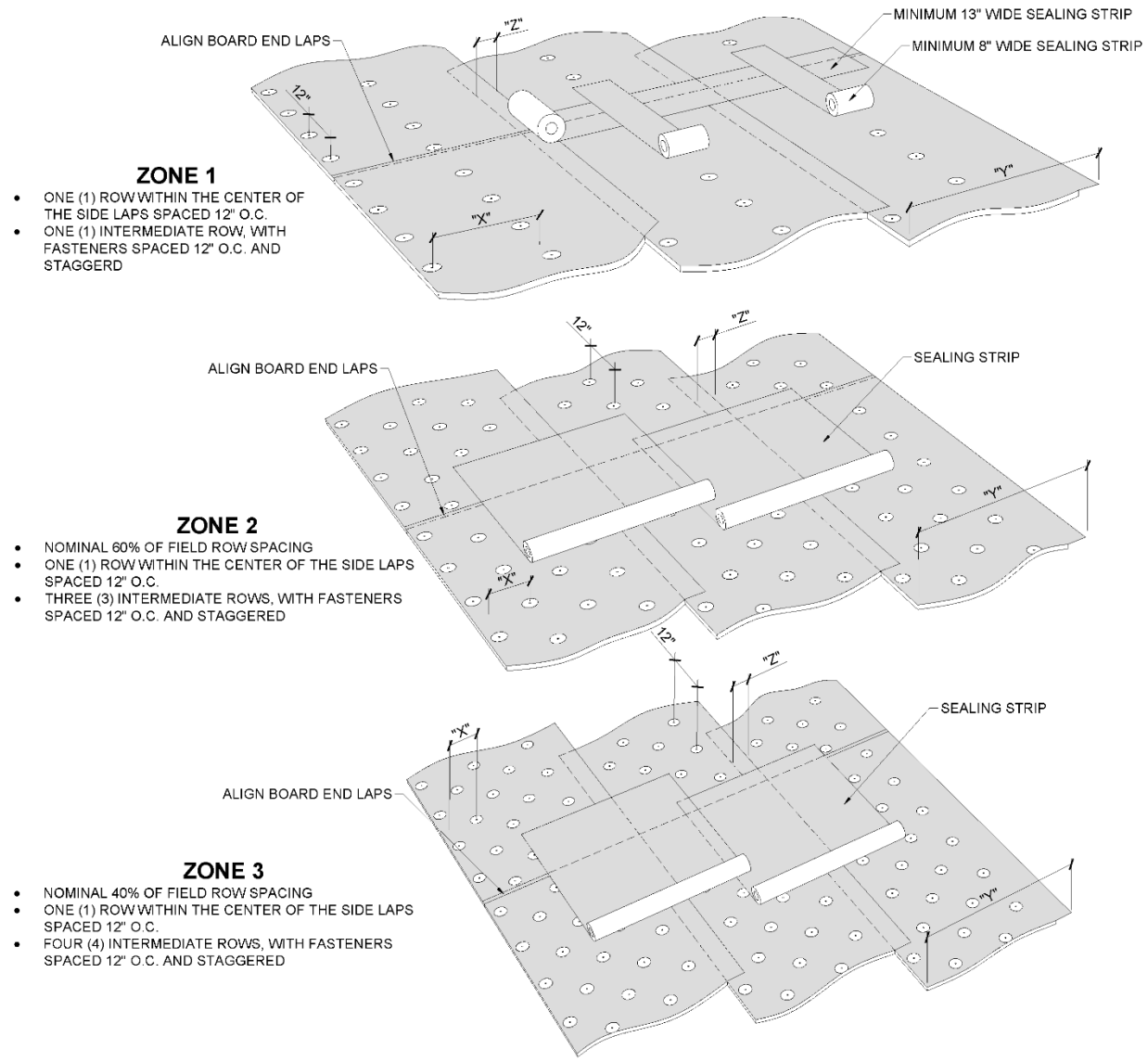
Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	12	36in	34
		2	12,12	18in	67
		3	12,12,12	12in	100

Figure 5.3.4c SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 12 in O.C. In Lap Fastening Pattern



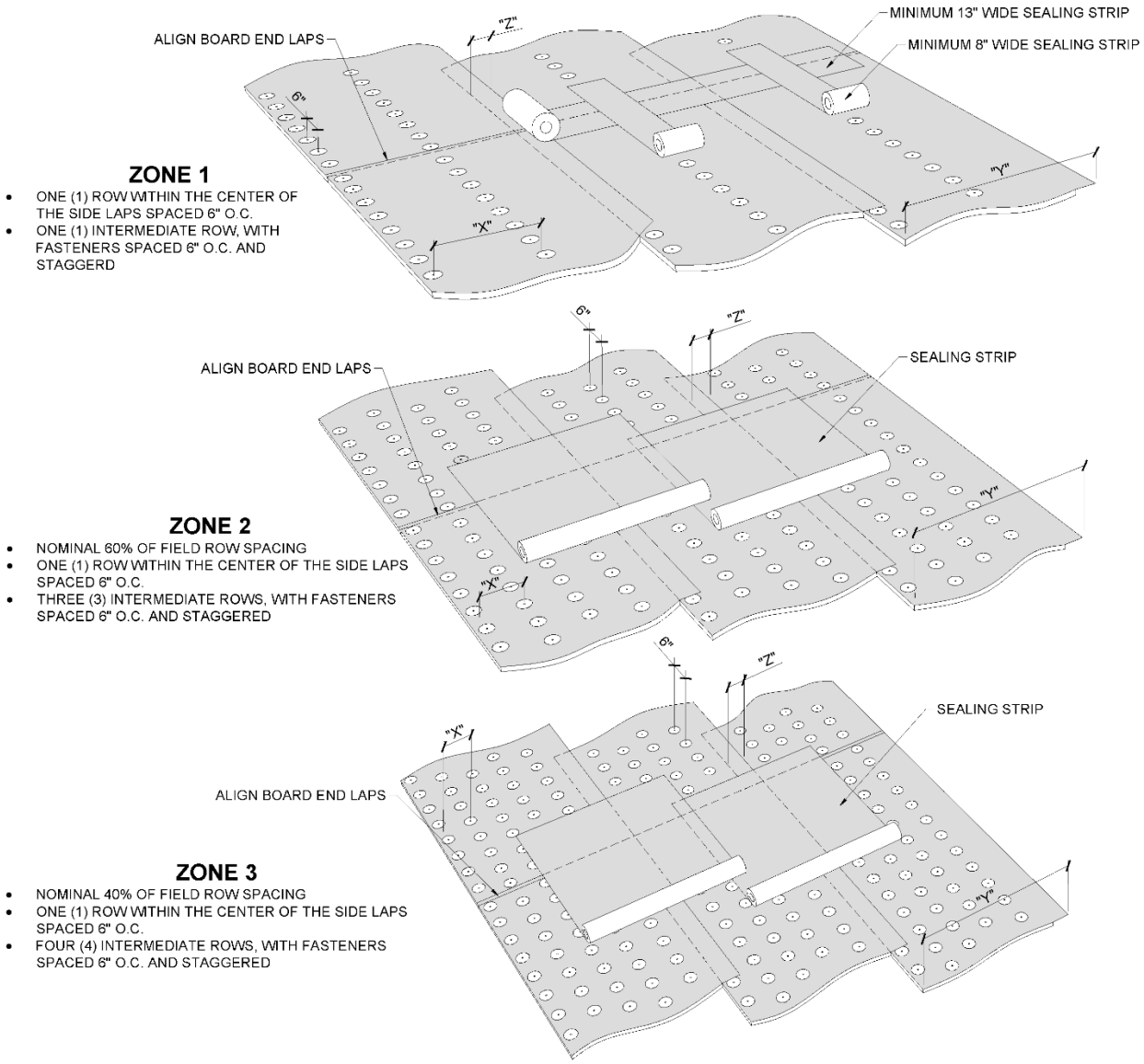
Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	6	36in	67
		2	6,6	18in	134
		3	6,6,6	12in	200

Figure 5.3.4d SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 6 in O.C. In Lap Fastening Pattern



Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	12,12	18in	67
		2	12,12,12,12	9in	134
		3	12,12,12,12,12	7.2in	167

Figure 5.3.4e SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 12 in O.C. In Lap and 1 Row in Between Laps at 12 in O.C. Fastening Pattern



Roll Width (Y)	Lap Width (Z)	Zone	Pattern	Row Spacing (X)	Fasteners Per Square
39in (1m)	3in	1	6,6	18in	134
		2	6,6,6,6	9in	267
		3	6,6,6,6,6	7.2in	334

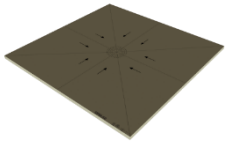
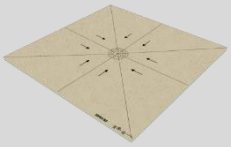
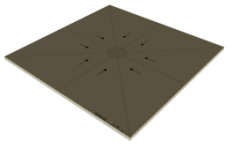
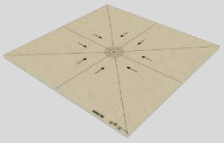
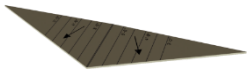
Figure 5.3.4f SBS Modified Bitumen Laminated Cover-Board, Mechanically Fastened, 6 in O.C. In Lap and 1 Row in Between Laps at 6 in O.C. Fastening Pattern

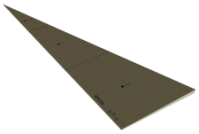
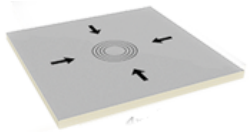
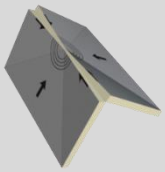
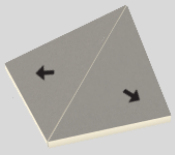
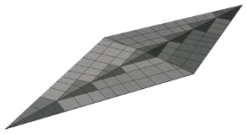
6 INSULATION ACCESSORIES

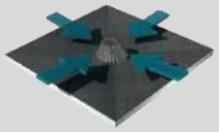
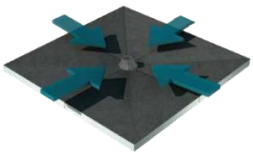
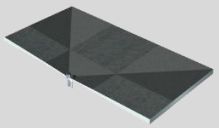
General:

- Insulation accessories include cants, tapered sumps, crickets and saddles.
- Refer to the insulation accessory product information and hyperlink indicated below for specific product data and installation instructions.
- Insulation accessories sold by SOPREMA® are included in SOPREMA® warranties. Refer to specific warranty documents for terms and conditions.
- Refer to Table 6a for a list of insulation accessory products.

Table 6a Insulation Accessories

Product	Description
SOPRACANT MB CANT STRIP	Asphaltic cant strips for use at wall and curb transitions. 
SOPRAROCK CANT STRIP	Non-combustible, mineral wool cant strip for use at wall and curb transitions. 
Fiberboard Cant Strip & Tapered Edge	Premanufactured fiberboard cant strip and tapered edge boards for use at wall and curb transitions. 
SOPRA-ISO SUMP	4 ft x 4 ft premanufactured polyisocyanurate sump for use around roof drains to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PLUS SUMP	4 ft x 4 ft premanufactured polyisocyanurate sump for use around roof drains to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO HINGED SUMP	8 ft x 8 ft premanufactured polyisocyanurate hinged sump for use around roof drains to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PLUS HINGED SUMP	8 ft x 8 ft premanufactured polyisocyanurate hinged sump for use around roof drains to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PRECUT CRICKET	Premanufactured polyisocyanurate cricket for use around curbs to promote positive drainage. Contact SOPREMA® for slope variations. 

Product	Description
SOPRA-ISO PLUS PRECUT CRICKET	Premanufactured polyisocyanurate cricket for use around curbs to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PRECUT HINGED CRICKET	Premanufactured polyisocyanurate hinged cricket for use around curbs to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PLUS PRECUT HINGED CRICKET	Premanufactured polyisocyanurate hinged cricket for use around curbs to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO TRANSITION PANEL	Premanufactured polyisocyanurate slope panels used to promote positive drainage. Contact SOPREMA® for slope variations. 
SOPRA-ISO PLUS TRANSITION PANEL	Premanufactured polyisocyanurate slope panels used to promote positive drainage. Contact SOPREMA® for slope variations. 
Hunter 4’ X 4’ Target Sump	4 ft x 4 ft pre-assembled polyisocyanurate sump panels. Contact Hunter Panels for slope variations. 
Hunter 8’ X 8’ Hinged Target Sump	8 ft x 8 ft pre-assembled polyisocyanurate sump panels. Contact Hunter Panels for more information. 
Hunter Pre-cut Valleys	4 ft x 4 ft pre-assembled polyisocyanurate valley panels. Contact Hunter Panels for slope variations. 
Hunter Pre-cut Hips	4 ft x 4 ft pre-assembled polyisocyanurate hip panels. Contact Hunter Panels for slope variations. 
Atlas SureSlope™ CKT	Polyisocyanurate hinged tapered and fill panels for cricket solutions. Contact Atlas Roofing Corporation for slope variations. 

Product	Description
Atlas SureSlope™ DST 4x4	4 ft x 4 ft pre-assembled polyisocyanurate sump panels. Contact Atlas Roofing Corporation for slope variations. 
Atlas SureSlope™ DST 8x8	8 ft x 8 ft pre-assembled polyisocyanurate sump panels. Contact Atlas Roofing Corporation for slope variations. 
Atlas SureSlope™ MTR	4 ft x 4 ft pre-assembled polyisocyanurate hip and valley panels. Contact Atlas Roofing Corporation for slope variations. 
Atlas SureSlope™ TES	8 ft long polyisocyanurate tapered edge panels. Contact Atlas Roofing Corporation for slope variations.