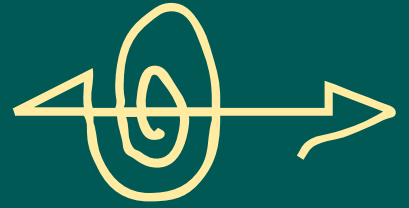


H U N T E R



H-SHIELD NB

INSTALLATION AND DESIGN **CRITERIA GUIDE**



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H-SHIELD NB

Flat Polyisocyanurate Insulation Manufactured On-Line to Oriented Strand Board

H-Shield NB is a rigid roof insulation composite panel composed of a closed cell polyisocyanurate foam core manufactured on-line to a fiber reinforced facer on one side and $\frac{7}{16}$ " on the other. H-Shield NB can also be manufactured off-line bonded to $\frac{5}{8}$ " OSB, $\frac{5}{8}$ " plywood, or $\frac{3}{4}$ " plywood.

APPLICATIONS

- Heavyweight Shingles
- Standing Seam Metal Roof Systems
- Tile
- Slate
- Single-Ply Roof Systems - Ballasted, Mechanically Attached, Fully Adhered. (For high wind speed warranty – see individual Single-Ply manufacturer approvals and listings)
- Suitable for new construction and re-roofing on both commercial and residential projects

PANEL CHARACTERISTICS

- Manufactured with NexGen Chemistry: Contains no CFCs, HFCs, HCFCs, is Zero ODP, EPA Compliant, and has virtually no GWP
- A superior combination of high insulating properties and a nailable surface
- Incorporates APA-TECO Rated Exposure 1 OSB and Plywood
- The edges of the wood panels are rabbeted to allow for expansion and contraction of the wood. The foam edges shall be installed tightly to achieve thermal integrity across the entire roof deck. Available as a non-rabbeted panel upon special request.
- Available in ASTM C1289 Type V, Grade 2 (20 psi)
- Available foam size is 47.5"x95.5" when manufactured on-line in thicknesses of 1.5" (38mm) to 4.0" (102mm)
- Available in foam size is 48"x96" when manufactured off-line in thicknesses of 1.5" (38mm) to 4.0" (102mm)
- Multiple Substrate Types Available:
OSB: $\frac{7}{16}$ " or $\frac{5}{8}$ " **Plywood:** $\frac{5}{8}$ " or $\frac{3}{4}$ " CDX or Fire-Treated

POTENTIAL LEED CREDITS FOR POLYISO USE

Energy and Atmosphere

- Optimize Energy Performance

Materials & Resources

- Building Life-Cycle Impact Reduction
- Environment Product Declaration
- Material Reuse
- Recycled Content
- Construction and Demolition Waste Management

Indoor Environmental Quality

- Thermal Comfort



H-SHIELD NB THERMAL VALUES

Long Term Thermal Resistance Values are based on ASTM C 1289

Thickness†		LTTR R-Value	Flute Spanability
(inches)	(mm)		
1.50	38	6.3	4 $\frac{3}{8}$ "
2.00	51	9.2	4 $\frac{3}{8}$ "
2.50	64	12.0	4 $\frac{3}{8}$ "
3.00	76	15.0	4 $\frac{3}{8}$ "
3.50	89	18.0	4 $\frac{3}{8}$ "
4.00	102	21.1	4 $\frac{3}{8}$ "

†Thickness is calculated with $\frac{7}{16}$ " OSB.

H-Shield NB is manufactured in the sizes listed above with additional sizes on our packaging and weights chart. R-values other than those listed can be achieved by installing a multi layer system consisting of an additional layer of flat polyiso under H-Shield NB.

CODES AND COMPLIANCES

- ASTM C 1289 Type V, Grade 2 (20 psi)
- International Building Code (IBC) Chapter 26
- State of Florida Product Approval Number FL 5968
- California Code of Regulations, Title 24, Insulation Quality Standard License #TI-1420
- Miami Dade County Product Control Approved
- Hail Rating: SH-1, VSH

UNDERWRITERS LABORATORIES INC CLASSIFICATIONS

- UL 1256
- Insulated Steel Deck Construction Assemblies – No. 120, 123
- UL 790
- UL 263 Hourly Rated P Series Roof Assemblies

UL CLASSIFIED FOR USE IN CANADA

- Refer to UL Directory of Products Certified for Canada for details

FACTORY MUTUAL APPROVALS

- FM 4450, FM 4470
- Approved for Class 1 insulated steel deck constructions. Refer to FM Approval's RoofNav for details on specific systems

TYPICAL PHYSICAL PROPERTY DATA

Polyiso Foam Core Only

Physical Property	Test Method	Value
Compressive Strength	ASTM D 1621	20 psi (138kPa, Grade 2)
Dimensional Stability	ASTM D 2126	2% linear change (7 days)
Moisture Vapor Transmission	ASTM E 96	< 1 perm (57.5ng/(Pa•s•m ²))
Water Absorption	ASTM C 209	<1% volume
Flame Spread*	ASTM E 84	< 75
Smoke Developed*	ASTM E 84	< 450
Service Temperature		-100° to 250°F (-73°C to 122°C)

*Meets the requirements of the IBC code. For specific Flame Spread or Smoke Developed Ratings please contact the Hunter Panels Technical Department

WARNINGS AND LIMITATIONS

Insulation must be protected from open flame and kept dry at all times. Store above ground on pallets and cover with breathable tarpaulins. Install only as much Polyiso as can be covered the same day with the completed roofing system. Do not leave exposed. Hunter Panels will not be responsible for specific designs by others, for deficiencies in construction or workmanship, for dangerous conditions on the job site, or for improper storage and handling.

INSTALLATION - SINGLE-PLY SYSTEMS

Shingles, Tiles, Slate, Metal and Membrane Roofing

H-Shield NB is installed wood side up over steel, plywood, or structural roof decks. Hunter SIP NB Panel Fasteners are required to secure the H-Shield NB to the steel or plywood deck. Wood blocking, if necessary, should be equal in thickness to the H-Shield NB and should be installed along the eaves and rake edges of the roof. The roofing system is then installed according to the manufacturer's recommendations. H-Shield NB may be adhered to a 1/2" per ft. max slope properly prepared cementitious deck (with a full mopping of Type III or Type IV asphalt or a low rise adhesive) only when manufactured online. **All H-Shield NB manufactured off-line must be mechanically attached.**

The Use of Synthetic Underlayments

The use of synthetic underlayments is becoming an industry norm (for steep slope applications). Hunter Panels strongly suggests the use of a synthetic underlayment under asphalt shingles unless otherwise specified by the shingle manufacturer. Synthetic underlayments provide excellent water resistance and absorb no moisture.

Vapor Retarders

In building construction, vapor retarders are used to inhibit or block the passage of moisture into roofing assemblies. Vapor barriers also serve as air barriers to limit the movement of moisture-laden air from the interior to the exterior. This is especially important during the construction phase where excessive moisture drive is present. To determine whether a vapor retarder is necessary, we recommend that calculations on the building's interior relative humidity, interior temperature conditions, and outside temperature fluctuations during the various seasons be performed prior to the completion of the design. Excessive moisture migration can cause unwanted condensation that will potentially damage the system or infiltrate the occupied space. Hunter Panels strongly suggests the use of a vapor retarder with a perm value of 0.5 or less on all projects except in extreme cooling conditions. Consult a licensed design professional, architect or engineer to establish whether or not a vapor retarder is necessary and to specify its type and location within the assembly. This criteria varies with geographical location and is therefore specific to each project.

Fastening Guidelines

Hunter Panels requires the use of the Hunter Panels SIP SD Panel Fastener for steel deck applications, the SIP WD for plywood deck applications, and SIP HD for heavy duty steel decks. Additional information on fasteners and fastening patterns are available on our website at www.hunterpanels.com.

Review manufacturer's specifications and details for complete installation information.

LOW SLOPE FM 1-90 FASTENING PATTERNS FOR H-SHIELD NB

Less than 1/2:12

ROOF TYPES

- Single Ply Membranes
- Standing Seam Metal

DECK TYPES FOR 16 FASTENER LAYOUT

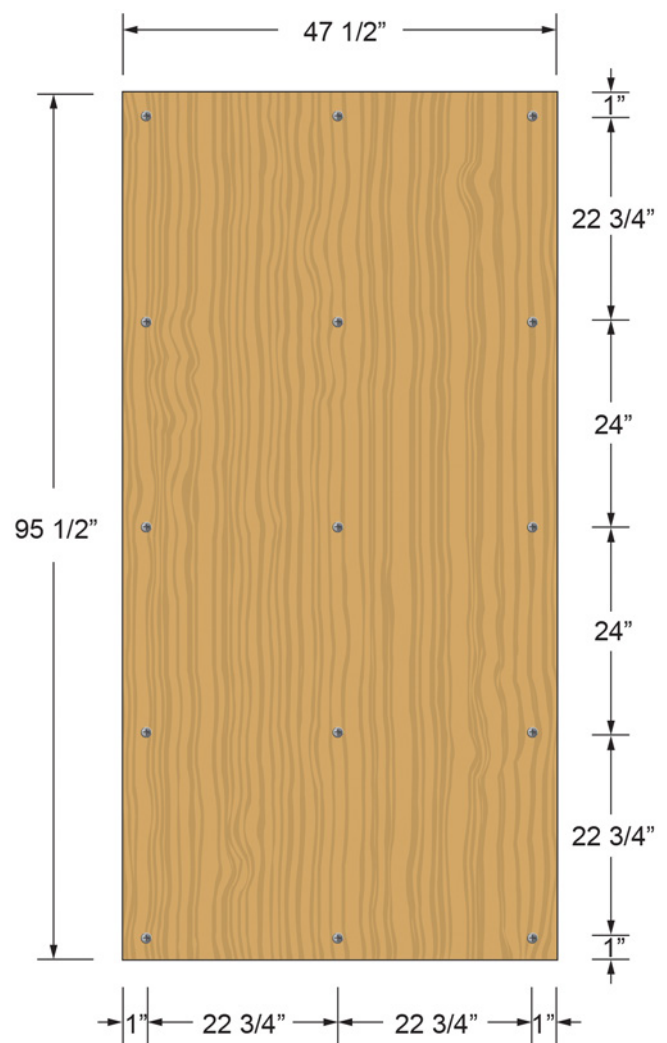
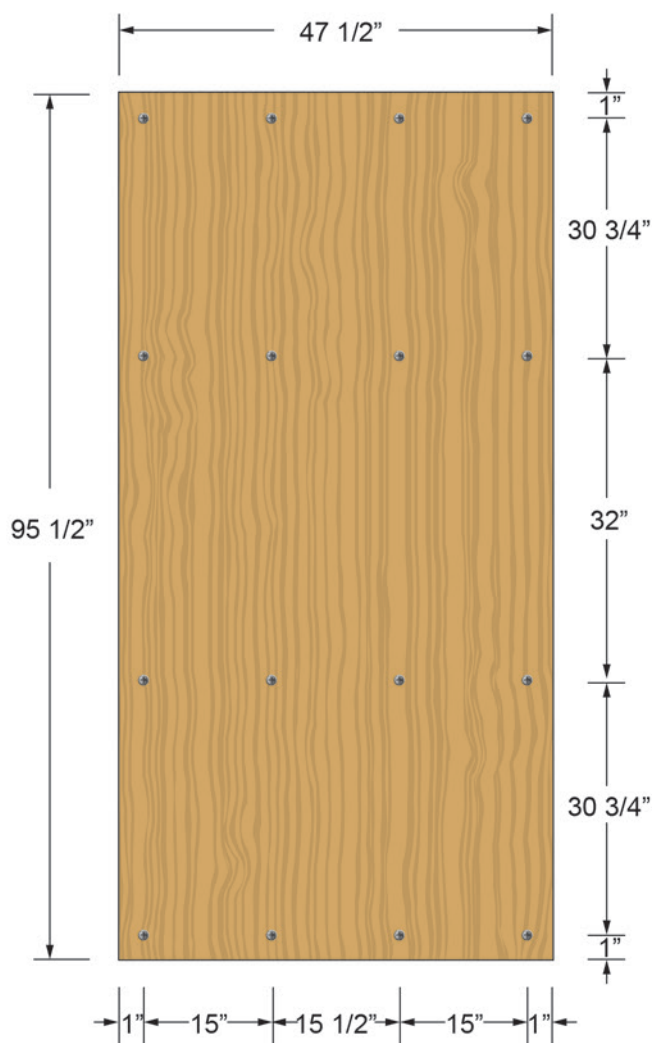
- Wood (over 16" or 32" OC framing)
- Steel
- Concrete

DECK TYPES FOR 15 FASTENER LAYOUT

- Wood (over 24" OC framing)
- Concrete

NOTES

- H-Shield NB must be fastened into a structural roof deck. H-Shield NB is not a structural panel and should not be installed directly to framing.
- Fasteners must be FM approved.
- For slate and tile roofs, contact manufacturer for recommendations.
- The fastening patterns below meet FM 1-60 and 90 requirements in low slope applications where applicable.
- For UL-90 rated assemblies under select metal roof systems, please contact the Standing Seam Metal manufacturer for approved fasteners.
- Additional fastening options at RoofNav.com



STEEP SLOPE FASTENING PATTERNS FOR H-SHIELD NB

3:12 to 12:12

ROOF TYPES

- Shingles
- Slate
- Tile
- Standing Seam Metal

DECK TYPES

- Wood
- Steel

NOTES

- H-Shield NB must be fastened into a structural roof deck. H-Shield NB is not a structural panel and should not be installed directly to framing.
- For slate and tile roofs, contact manufacturer for recommendations.
- For UL-90 rated assemblies under select metal roof systems, please contact the Standing Seam Metal manufacturer for approved fastener, plate and fastening pattern.
- For a complete fastening guide please contact Hunter Panels or refer to DrJ TER 2101-01.
- For fastening pattern images, please contact Hunter Panels or refer to the H-Shield NB Steep Slope Fastening Pattern Guide on our website.



WOOD DECKS

Fastener Information - SIP WD

The Hunter Panels SIP WD Fastener is intended to mechanically attach Cool-Vent and H-Shield NB to plywood substrates. The Hunter Panels SIP WD Fastener has the following features:

- FM approved—plates not required
- Pull-out values for plywood
- Star/spider head eliminates need for washer and offers dramatically increased pull-out value
- Multiple bits included in each pail
- 100% American made
- Fast, one-step installation
- No pre-drilling

Test Description	Typical Value
Pull-through (lbs)	630
Pull-out (lbs):	
1/2" plywood	442
5/8" plywood	459
3/4" plywood	710
Douglas Fir (1" pen.)	768

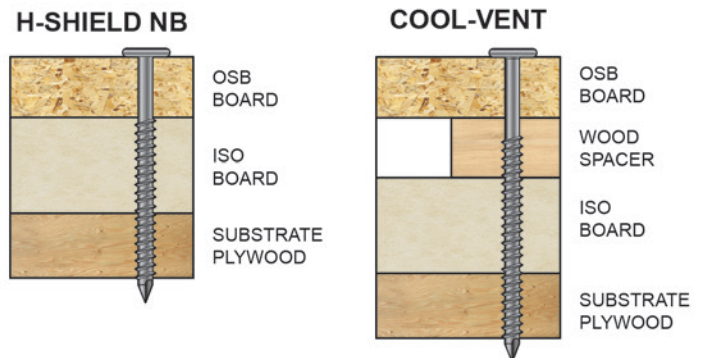
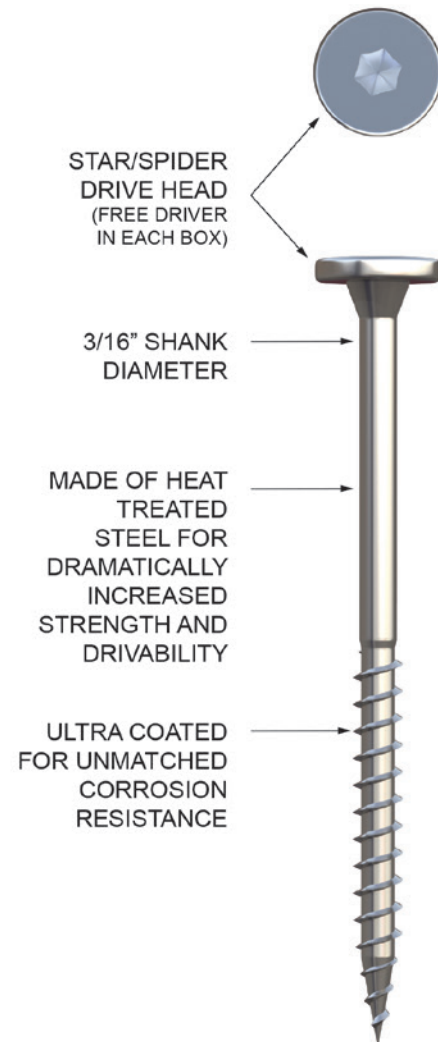
Fasteners should never be struck with a hammer during installation.

PHYSICAL DATA CHART

Head Diameter	.625"
Thread Diameter	.240"
Shank Diameter	.190"
Fastener Length	3.5", 4", 4.5", 5", 5.5", 6", 6.5", 7", 7.5", 8", 9", 10", 11", 12", 13", 14"

* 1" Penetration into solid sawn T&G

* 3/4" penetration beyond underside of board when fastening into OSB and plywood decks.



STEEL DECKS

Fastener Information - SIP SD

The Hunter Panels SIP SD Fastener is intended to mechanically attach Cool-Vent and H-Shield NB to 18 – 22 gauge corrugated steel decking. The Hunter Panels SIP SD Fastener has the following features:

- FM approved—plates not required
- Pull-out values for steel
- Star/spider head eliminates need for washer and offers dramatically increased pull-out value
- Multiple bits included in each pail
- 100% American made
- Fast, one-step installation
- No pre-drilling when used on a steel deck

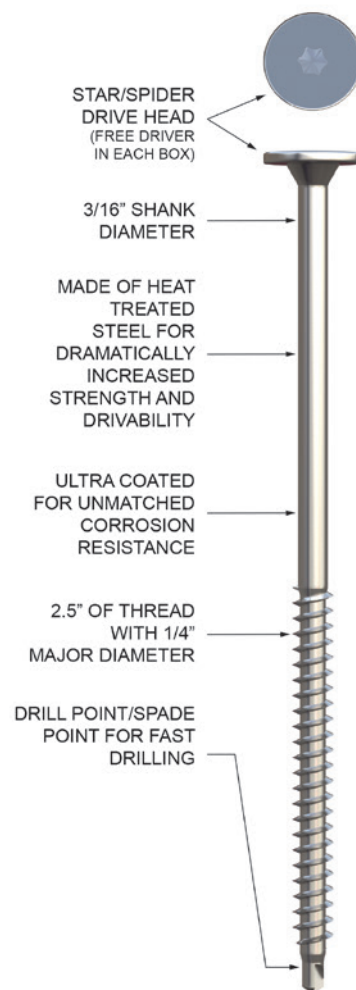
Test Description	Typical Value
Pull-through (lbs)	630
Pull-out (lbs):	
22 gauge metal	510
18 gauge metal	920

Fasteners should never be struck with a hammer during installation.

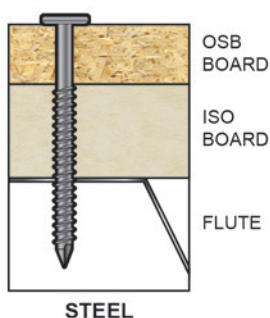
PHYSICAL DATA CHART

Head Diameter	.625"
Thread Diameter	.240"
Shank Diameter	.190"
Fastener Length	3.5", 4", 4.5", 5", 5.5", 6", 6.5", 7", 7.5", 8", 9", 10", 11", 12", 13"

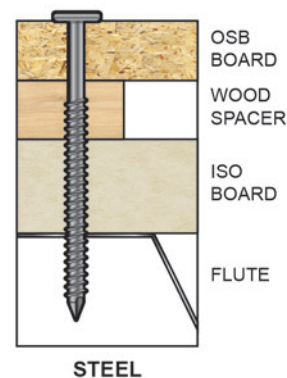
Minimum 3/4" penetration through steel decking.



H-SHIELD NB



COOL-VENT



HEAVY DUTY STEEL DECKS

Fastener Information - SIP HD

Hunter Panels SIP HD Fastener is intended to mechanically attach Cool-Vent or Hunter NB to 16 gauge or greater corrugated steel decking. Hunter Panels SIP HD Fastener has the following features:

- FM approved—plates not required
- Pull-out values for steel
- Star/spider head eliminates need for washer and offers dramatically increased pull-out value
- Multiple bits included in each pail
- 100% American made
- Fast, one-step installation
- SIP/HD is for 16 gauge or thicker steel deck
- No pre-drilling

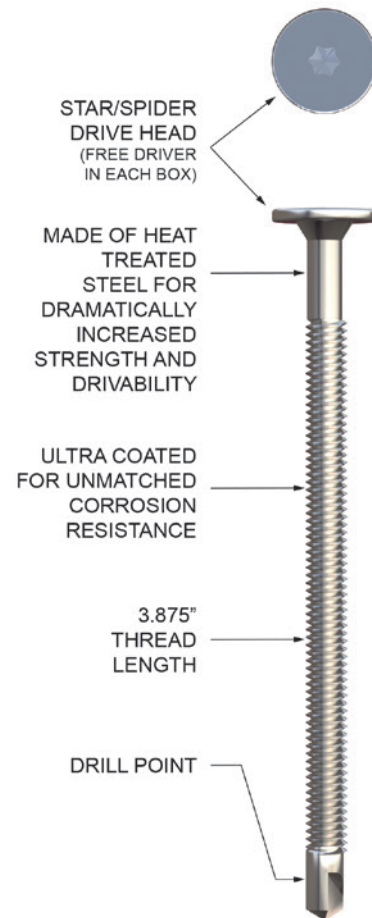
Test Description	Typical Value
Pull-through (lbs)	630
Pull-out (lbs):	
Structural Steel 16 ga	770

Fasteners should never be struck with a hammer during installation.

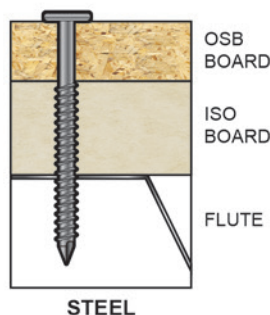
PHYSICAL DATA CHART

Head Diameter	.625"
Thread Diameter	3.875"
Shank Diameter	.212"
Fastener Length	4.5", 6.0", 8.0"

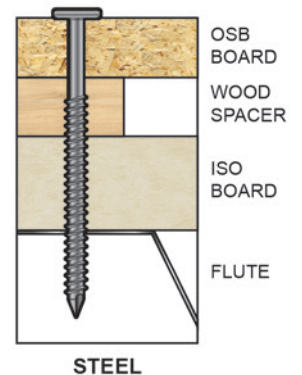
Minimum 3/4" penetration through steel decking.



H-SHIELD NB



COOL-VENT

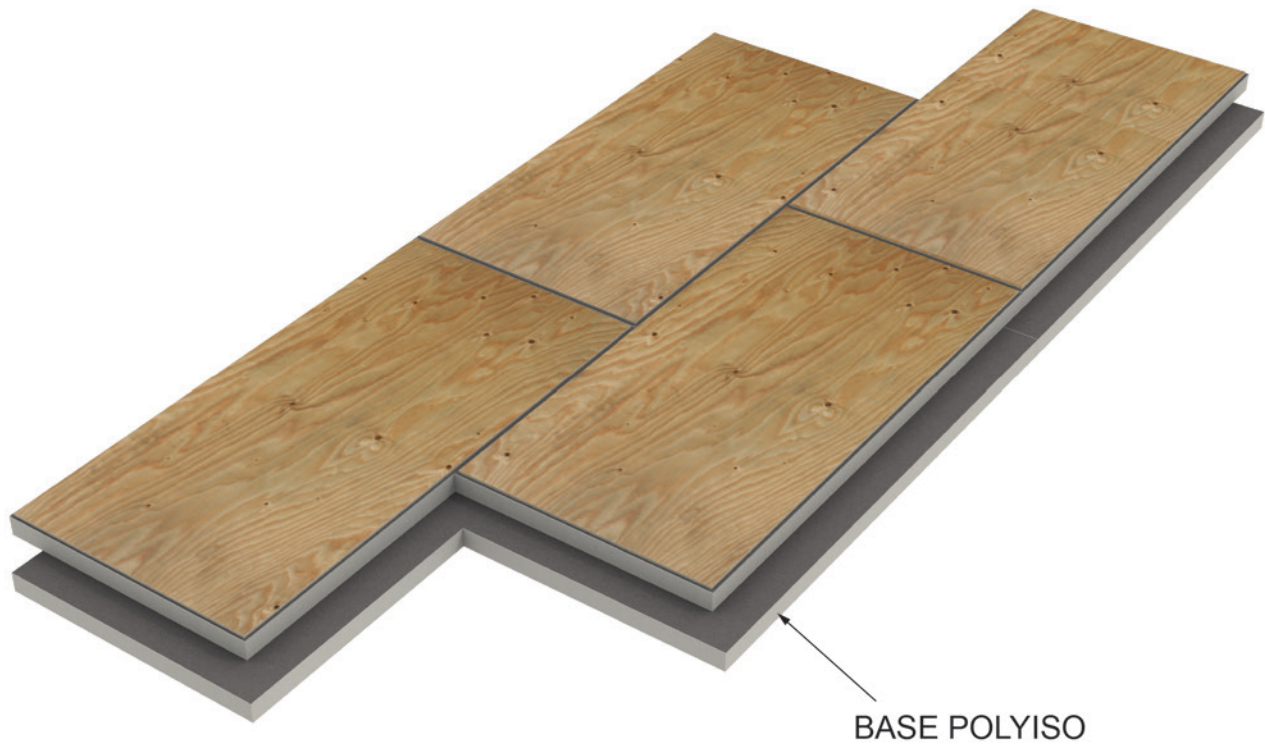


SUGGESTED LAYOUT FOR MULTI-LAYER SYSTEM

H-Shield NB over flat polyiso

NOTES

- Recommend a minimum of 6" stagger on all sides of the base layer and subsequent layers of polyiso being installed in a multi-layer system.

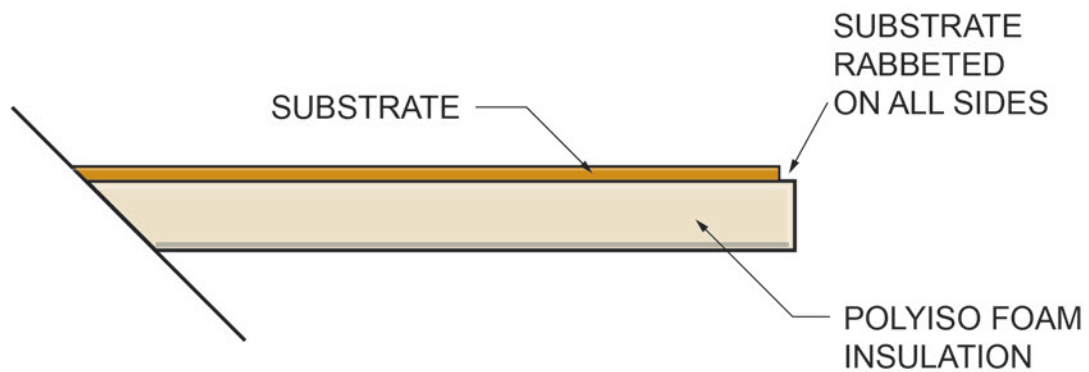


RABBETED EDGE DETAIL

NOTES

Rabbeted Edge Definition

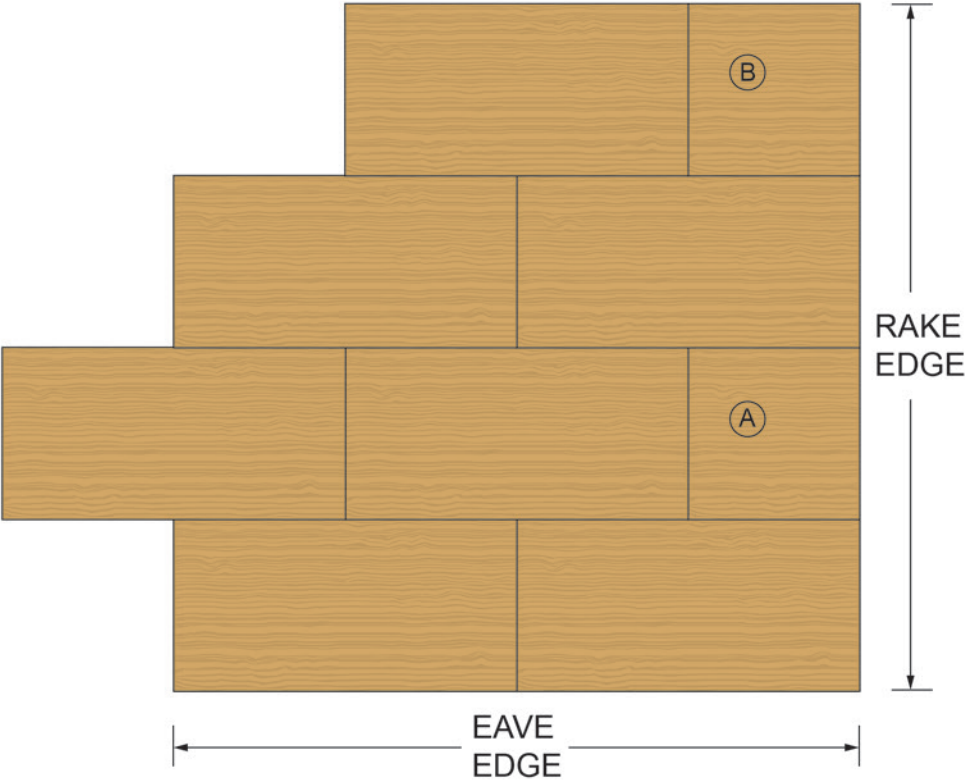
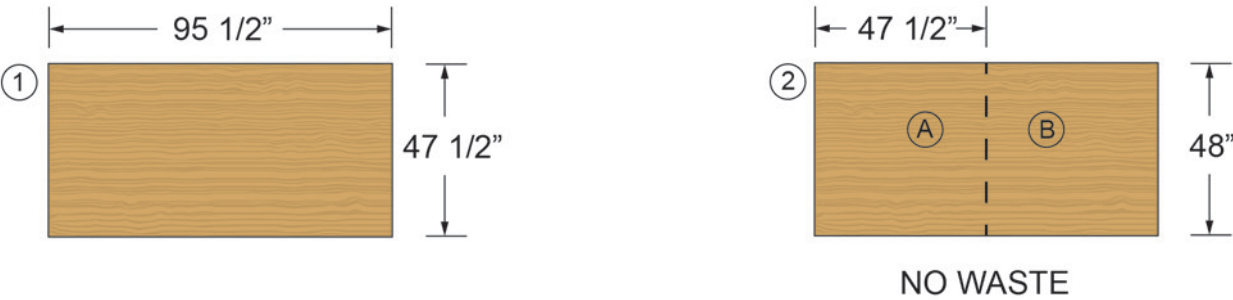
- The wood substrate on H-Shield NB is rabbeted (routed) back on all four sides to allow for expansion of the wood substrate.



GETTING STARTED

NOTES

- Stagger rows by following H-Shield NB layout above. When H-Shield NB is cut into two equal halves, no waste occurs.



EAVE AND RAKE EDGE BLOCKING DETAIL

NOTES

Eave Edge

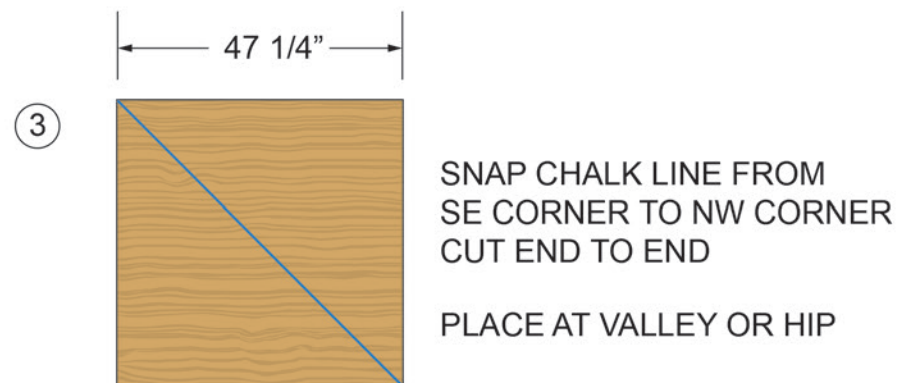
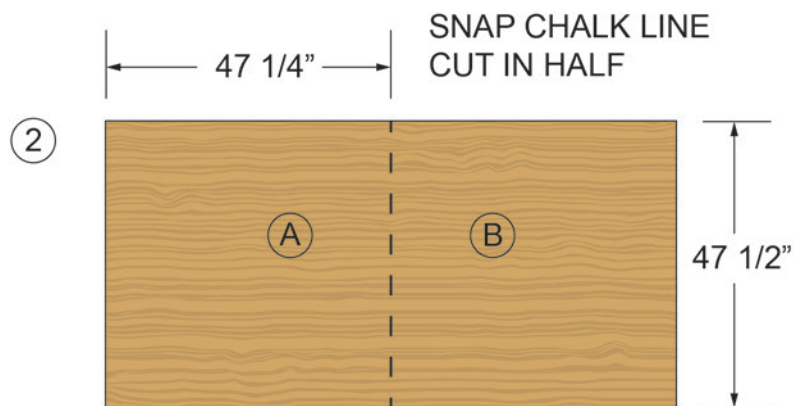
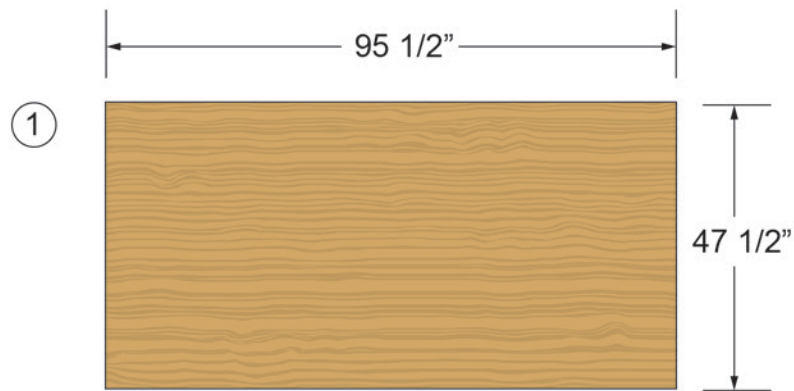
- Pressure treated blocking to the panel thickness of H-Shield NB shall be installed along the eave & rake edges.



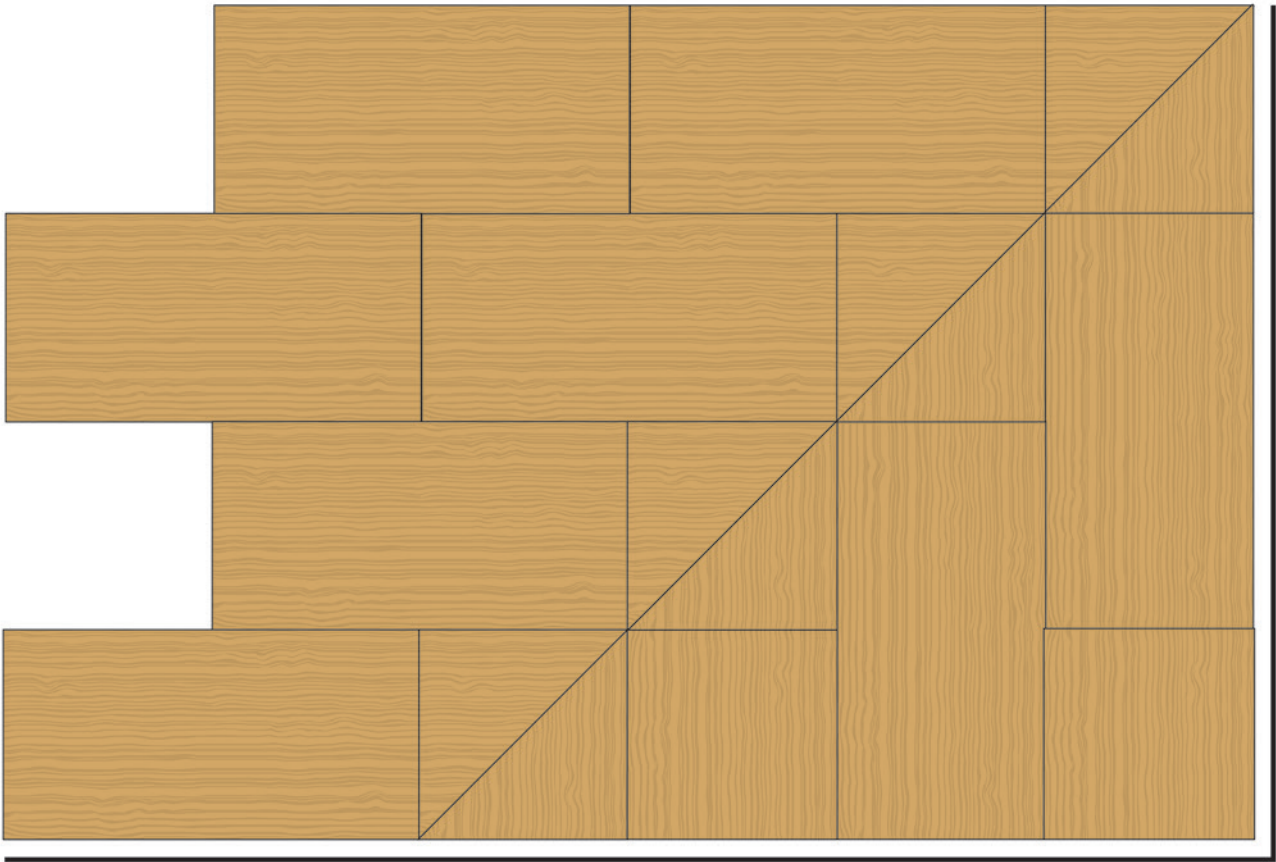
HIP AND VALLEY CUTTING

NOTES

- For valleys and hips, cut a piece of H-Shield NB in half, snap a chalk line from SE to NW corner and cut end to end.



HIP AND VALLEY DETAIL

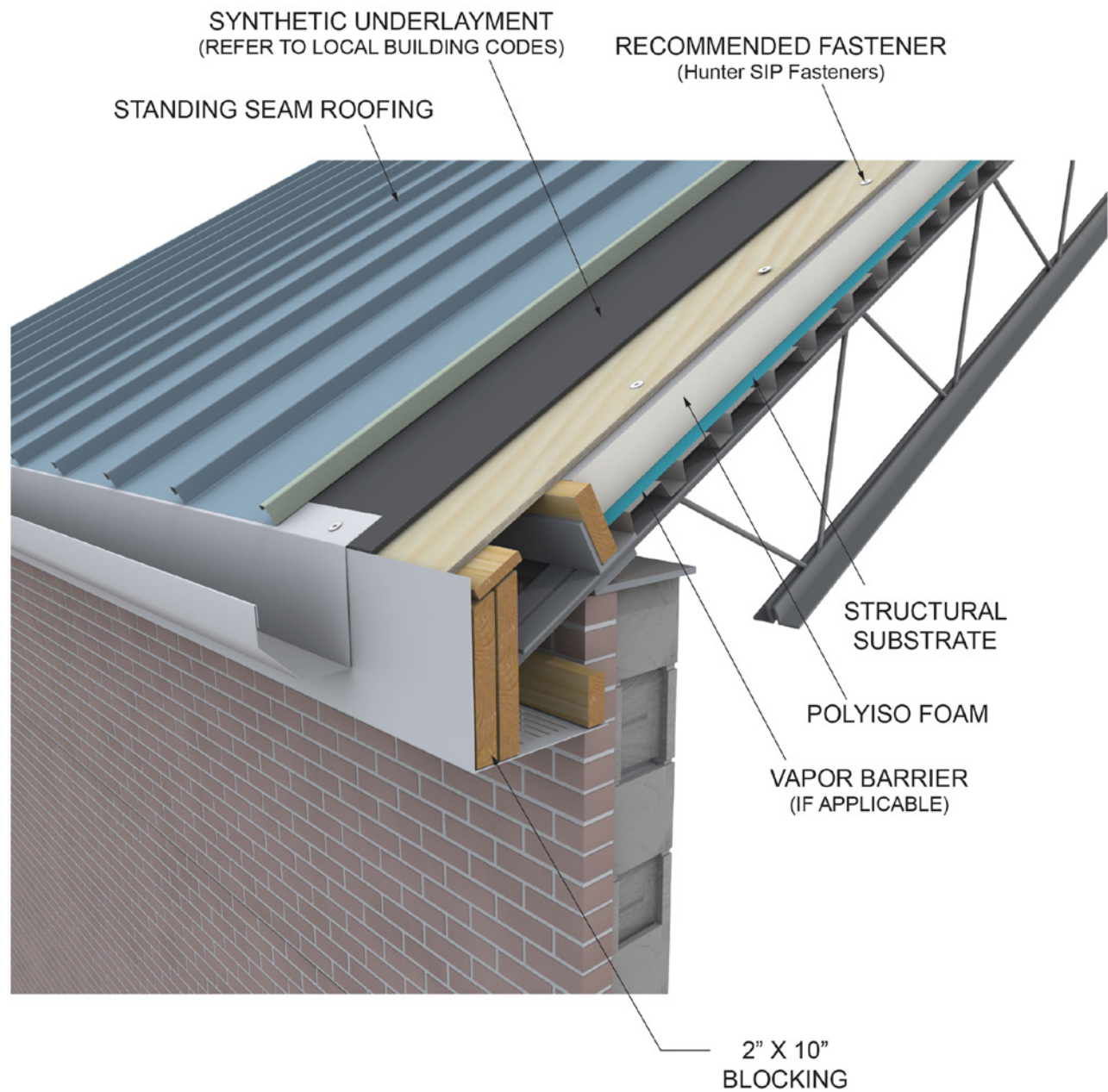


EAVE DETAIL 1 (TYP)

Steel Deck

NOTES

- Fasten H-Shield NB panels into top flutes of steel deck

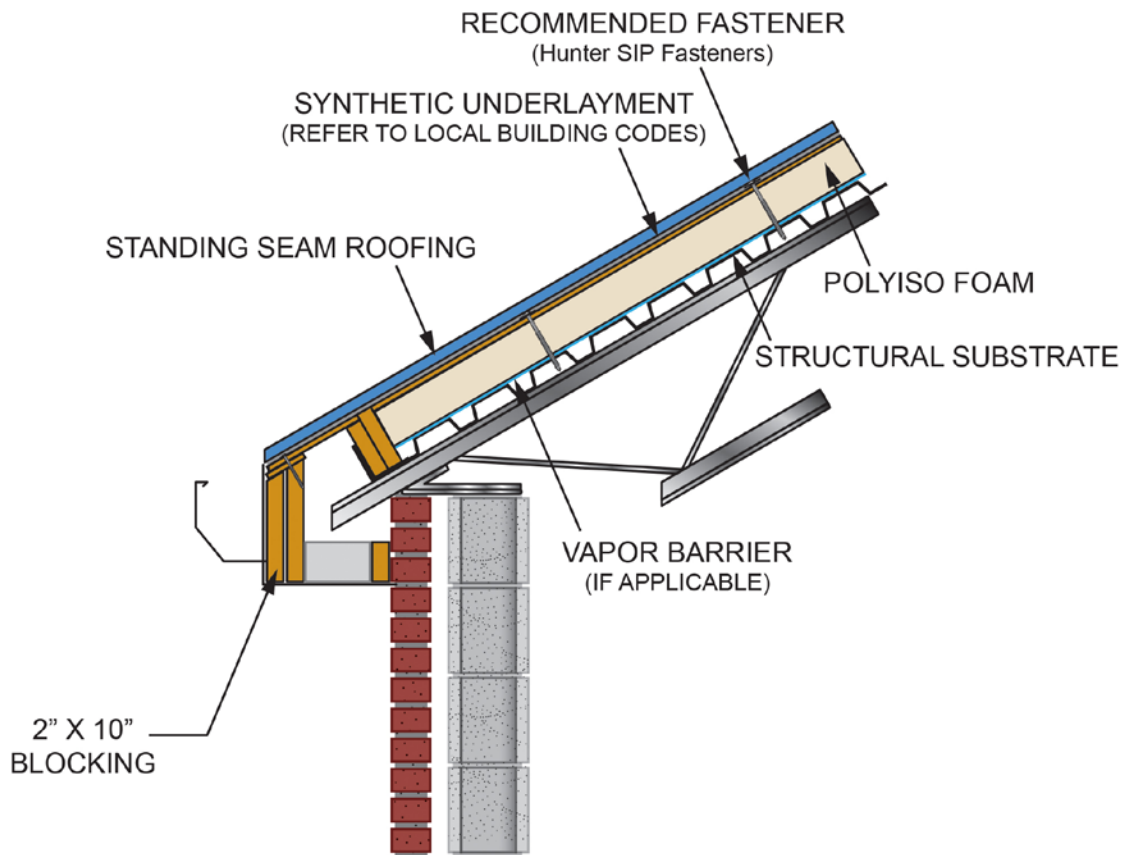


EAVE DETAIL 1 (TYP)

Steel Deck

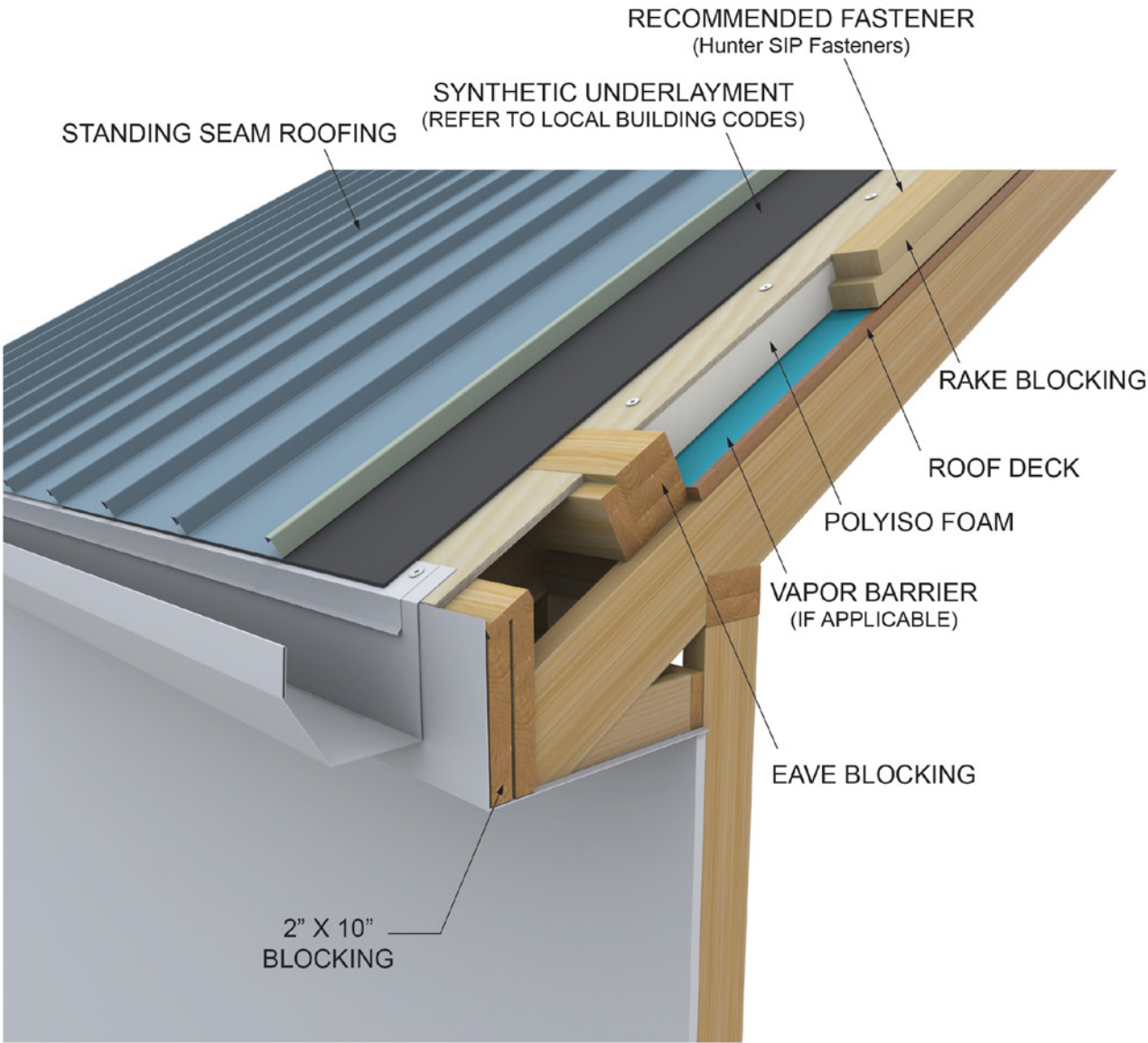
NOTES

- Fasten H-Shield NB panels into top flutes of steel deck



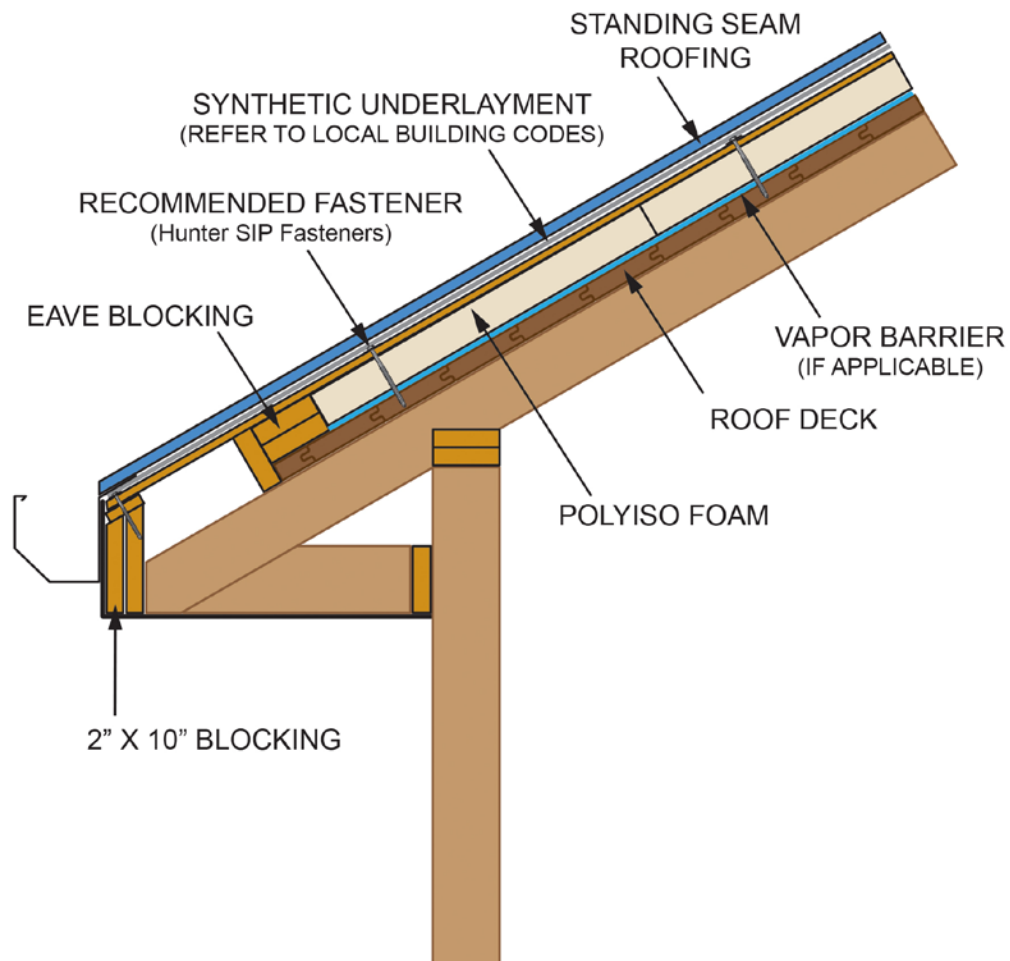
EAVE DETAIL 2 (TYP)

Wood Deck

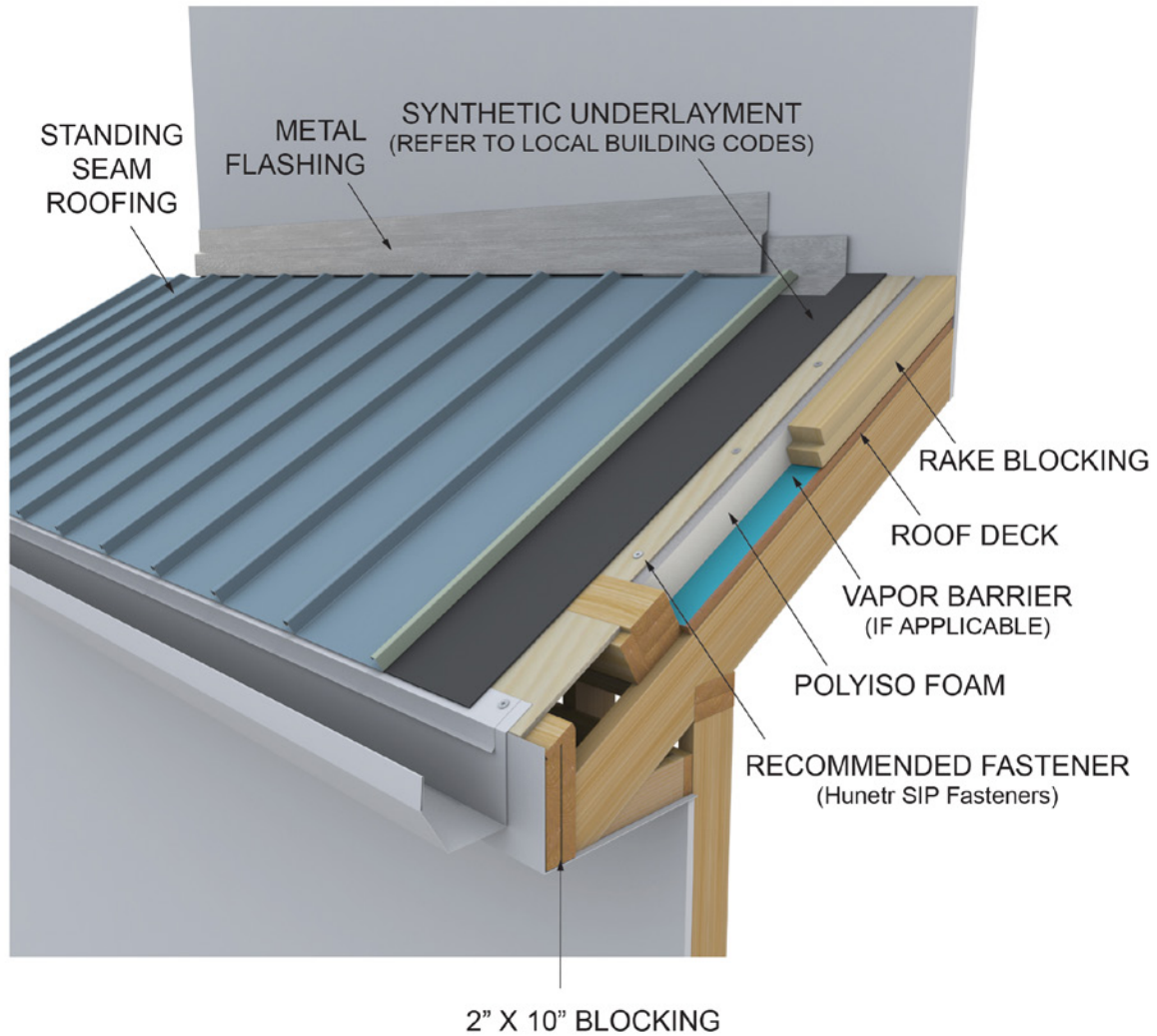


EAVE DETAIL 2 (TYP)

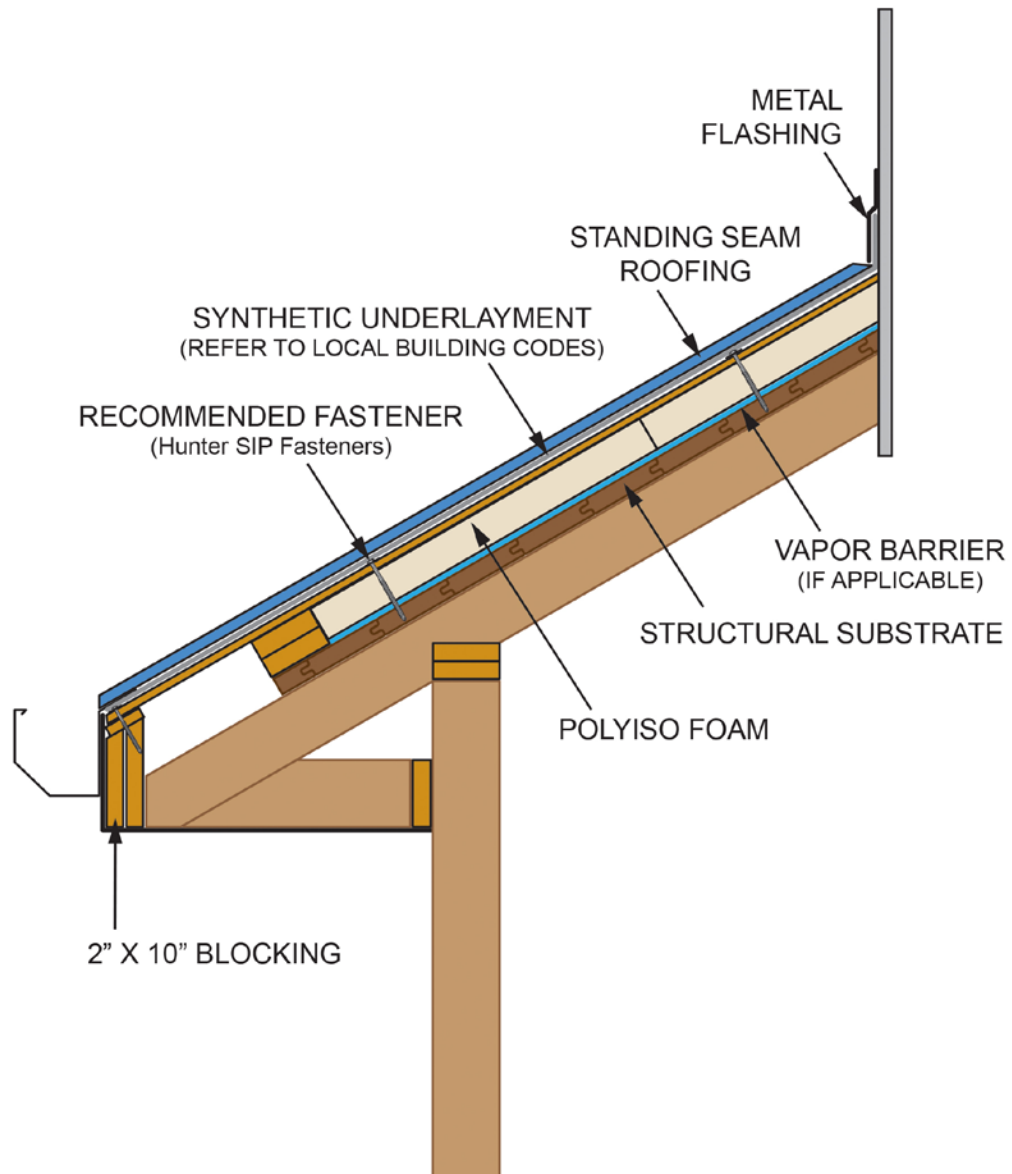
Wood Deck



ROOF / WALL DETAIL



ROOF / WALL DETAIL



DESIGN CRITERIA GUIDE

1. CONSTRUCTION GENERATED MOISTURE

2. VAPOR DIFFUSION RETARDERS

3. MULTI-LAYERED ROOF INSULATION

4. FASTENER REQUIREMENTS

5. USE OF SYNTHETIC UNDERLAYMENTS

6. SHINGLE CONSIDERATION



1. CONSTRUCTION GENERATED MOISTURE

Buildings under construction are susceptible to water and or moisture intrusion from the unfinished portions of the roof or adjacent components of the building. Some of the most common sources of moisture drive are:

- Pouring of a concrete floor or other masonry work in an enclosed building
- The use of heaters or "salamanders" to provide more comfortable conditions or help cure the freshly poured concrete.
- The use of oil burning heaters
- The use of paint, plaster and other water based construction materials

Effects of moisture generated during construction on the roofing system can cause the following conditions:

- Water accumulation in the steel deck flutes causing corrosion and possible intrusion into the building
- Condensed moisture can promote microorganism growth
- Moisture drawn into the roof system may have a deleterious effect on the physical properties of the roof insulation (i.e. dimensional stability, thermal properties)

Adherence to good construction practices can minimize some or all of the above-mentioned conditions. Adequate ventilation should be provided at all times for enclosed construction to limit moisture drive through the underside of the roof deck. The use of multilayered roof insulation assemblies will enhance thermal performance as well as restrict the transport of moisture into the roof system. During roof construction, the completed roof section should be tied off each day to protect the new roof from water entry.

2. VAPOR DIFFUSION RETARDERS

In building construction, vapor retarders are used to inhibit or block the passage of moisture into roofing assemblies. Vapor barriers also serve as air barriers to limit the movement of moisture-laden air from the interior to the exterior. This is especially important during the construction phase where excessive moisture drive is present. To determine whether a vapor retarder is necessary, we recommend that calculations on the building's interior relative humidity, interior temperature conditions and outside temperature fluctuations during the various seasons be performed prior to the completion of the design. Excessive moisture migration can cause unwanted condensation that will potentially damage the system or infiltrate the occupied space.

Hunter Panels strongly suggests the use of a vapor retarder with a perm value of 0.5 or less on all projects except in extreme cooling conditions. Consult a licensed design professional, architect or engineer to establish whether or not a vapor retarder is necessary and to specify its type and location within the assembly. This criteria varies with geographical location and is therefore specific to each project.

WARNINGS AND LIMITATIONS

Insulation must be protected from open flame and kept dry at all times. Store above ground on pallets and cover with breathable tarpaulins. Install only as much Polyiso as can be covered the same day with the completed roofing system. Do not leave exposed. Hunter Panels will not be responsible for specific designs by others, for deficiencies in construction or workmanship, for dangerous conditions on the job site, or for improper storage and handling.

WARRANTY

Hunter Panels will not be responsible for leakage, damage or failure of any kind caused by improper application or design, structural movement, accident or natural hazard, defective membrane or improper maintenance.

Hunter Panels warrants that its polyisocyanurate foam will conform to its published physical properties, federal specifications and ASTM standards. Hunter Panels does not warrant the performance or physical properties of the wood substrate incorporated into the H-Shield NB assembly.

Hunter Panels will not be liable for incidental or consequential damages to the structure, its contents or occupancy.

Hunter Panels makes no warranties or guarantees of any kind expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose except as stated herein.



3. MULTI-LAYERED ROOF INSULATION

Multi-layering of polyiso in any roof application installed with staggered joints offers a number of advantages and is considered good roofing practice because doing so:

- Minimizes thermal loss at the joints of the insulation, prevents thermal bridging
- Prevents moisture from inside of the structure from condensing on the underside of the finished roof system

4. FASTENER REQUIREMENTS

To ensure optimal performance, Hunter Panels requires the use of the Hunter SIP SD or Hunter SIP HD for steel deck applications, and the Hunter SIP WD for plywood deck applications.

5. USE OF SYNTHETIC UNDERLAYMENTS

The use of synthetic underlayments is becoming the industry norm for steep slope roofing assemblies. Hunter Panels **strongly suggests** the use of a synthetic underlayment under asphalt shingles unless the shingle manufacturer has specifically eliminated it. Synthetic underlayments offer several key advantages over traditional asphalt felt:

- Larger rolls with fewer laps and less nailing
- Lighter weight for easier handling and quicker installation
- May be left exposed for longer periods of time without organic deterioration
- Synthetic reinforced polypropylene wicks the moisture and provides excellent water resistance
- Some manufacturers of synthetic underlayment offer products with prolonged exposure to UV rays, greater fire resistance, tear strength and puncture resistance

Hunter Panels does not recommend the use of 15# and 30# roofing felt as an underlayment to asphalt shingles on our H-Shield NB product. Use of these felt products will void any and all claims regarding a H-Shield NB assembly. Hunter Panels cannot be responsible for claims arising out of aesthetic anomalies caused by roofing felts in the assembly.

6. SHINGLE CONSIDERATION

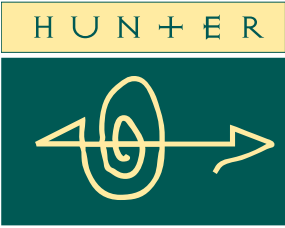
The roof covering is one of the most important considerations of any low slope or steep slope application. In most steep slope roofing projects, however, the visual appeal or aesthetic look plays almost as large a role as the true performance and physical properties of the shingle. Please confirm that your shingle manufacturer does not require a ventilated roof system. If a vented system is required, Cool-Vent panels can be substituted.

Please go to www.hunterpanels.com for the latest product literature, specifications and other documents relating to this product.

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15 Franklin Street ■ Portland, Maine 04101 ■ 888.746.1114 ■ info@hpanels.com ■ www.hunterpanels.com