

SOLAR ROOF V3 | HORIZONTAL BANDING UNDERLAYMENT



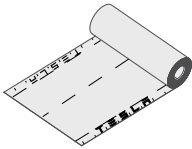
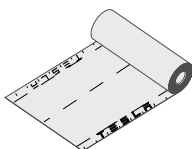
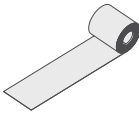
TESLA UNDERLAYMENT

Tesla Underlayment is a self-adhering peel and stick roofing underlayment designed for sloped roof applications to help protect against water infiltration from wind-driven rain, snow, and ice damming.

Note: There are two types of Tesla Underlayment: one version for a Class A roofing system and a second version for an unclassified or Class-C roofing system. The type of underlayment shipped will be dependent on the local building code requirements for a given project.

CODE COMPLIANCE REPORTS AND STANDARDS:	
Intertek CCRR-0386 Underlayment	ICC AC48/ICC AC188
Intertek CCRR-0351 Solar Roof System	Solar Roof System Florida Product #: FL31342
PRI ER 2356E01 and PRI ER 2489E01	TAS100
	ASTM D1970
	ASTM E108 Class-A and Class-C (See product evaluation report for details)
	Underlayment Florida Product #: FL34863

UNDERLAYMENT PART NUMBERS:

FR ROOFING UNDERLAYMENT CLASS-A 1613738-03-A  Dimensions: Full-Width Roll: 38" W with 3" Selvage Edge (Overlap Edge), 67' Length Roll Coverage (Gross): 212.16 sqft/roll Roll Coverage (Net): 195.41 sqft/roll	NON-FR ROOFING UNDERLAYMENT CLASS-C 1751844-00-A  Dimensions: Full-Width Roll: 38" W with 3" Selvage Edge (Overlap Edge), 107' Length Roll Coverage (Gross): 338.83 sqft/roll Roll Coverage (Net): 312.08 sqft/roll	UNDERLAYMENT, DETAIL ROLL 1636403-00-A  Dimensions: Full-Width Roll: 12.67" W 67" Length Roll Coverage (Gross): 70.74 sqft/roll
--	---	---



WARNING

Slip hazards are present with the peeled release liner and unsecured underlayment on the roof, ensure each section is adhered, and use fasteners if needed.



CAUTION

In high wind conditions underlayment has the possibility of catching sail in the winds.

DECK PREPARATION

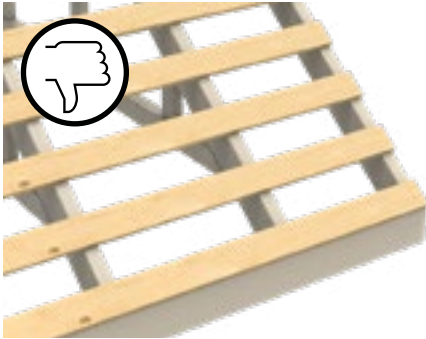
The roof deck surface needs to be free from dust, dirt, debris, loose or protruding nails or staples, or other protrusions. Lifted fasteners may compromise the new underlayment. Hammer down nails and staples flush to the deck or remove them. Ensure that the work surface is clean, smooth, and dry to achieve optimal underlayment adhesion performance. Do not install over the following conditions:

- Widely spaced sheathing boards (sometimes referred to as “skip sheathing”)
- Sheathing less than the required minimum thickness. See Tear-Off And Deck Prep for more details on sheathing requirements.
- Areas where the sheathing gaps are greater than 1/4”
- Areas with water damage, dry rot, mold, or pest damage

Note: If installing Tesla Underlayment over a single-layer of comp roof, please refer to the guidelines outlined within work instruction:

[Installing Underlayment on Comp](#)

Skip sheathing



Large gaps



Dry rot or other damage

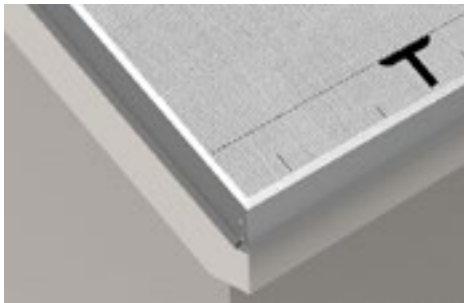


APPLICATION

Tesla Underlayment shall be stored upright, in its original packing, at a temperature between 50°F to 90°F (10°C-32°C) for a minimum of two days before installation. If stored properly before installation, the underlayment is approved to be installed in ambient temperatures between 14°F to 105°F (-10°C to 74°C). Tesla Underlayment shall be applied directly to plywood, OSB, or a qualifying single-layer comp roof. Do not install over a frosted or wet roof surface. Ensure the area is free of voids in order to achieve optimal adhesion and an installation. The use of a roller to apply pressure is required. Achieve optimal adhesion, use a roller to apply pressure. Avoid creating air pockets when applying the underlayment and use a roller or broom to evacuate any air void as you lay each course of underlayment. When installing the Tesla Underlayment in ambient temperatures less than 40°F (4.4°C) or greater than 90°F (32°C), “blind nailing” is required. See section [Blind Nailing for Extreme Conditions](#) for more details on this requirement.

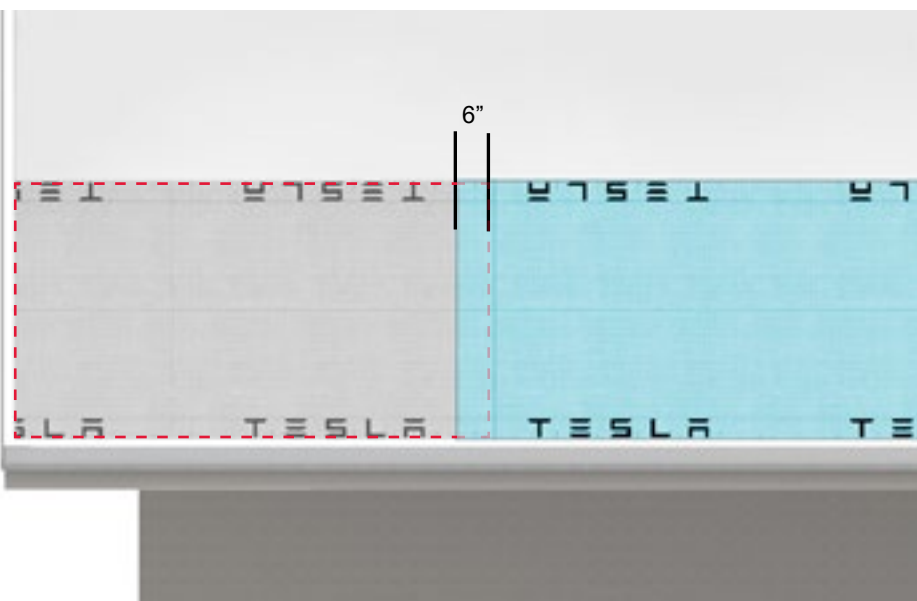
UNDERLAYMENT | FASTENING AND LAPPING

Begin with a starter course of underlayment 1/2" away from the rake and eave drip edge. If installing underlayment in temperatures less than 40°F (4.4°C) or greater than 90°F (32°C), "blind nailing" of the overlap section shall be required. See section on [Blind Nailing for Extreme Conditions](#) for more details.

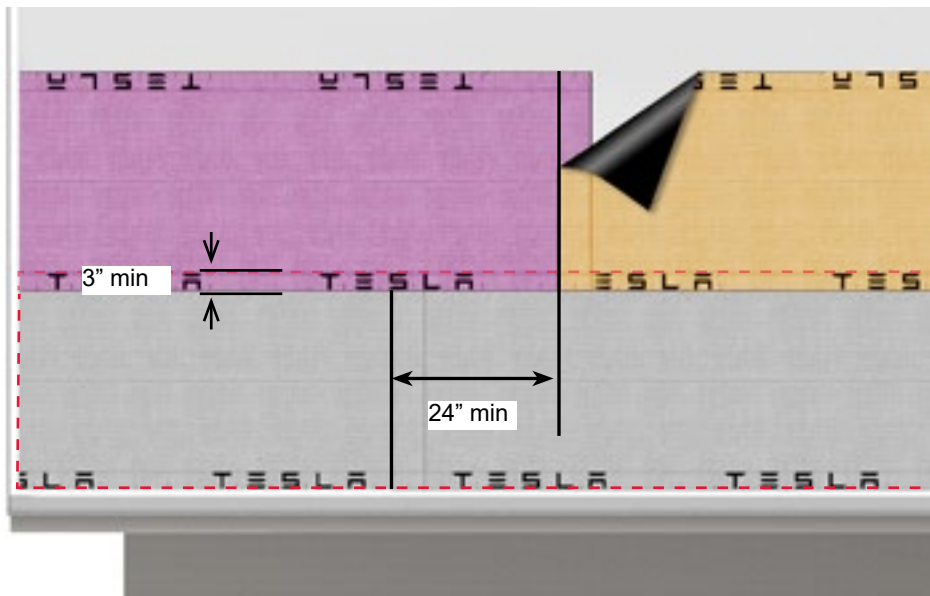


Close Up of Underlayment Offset At Edge

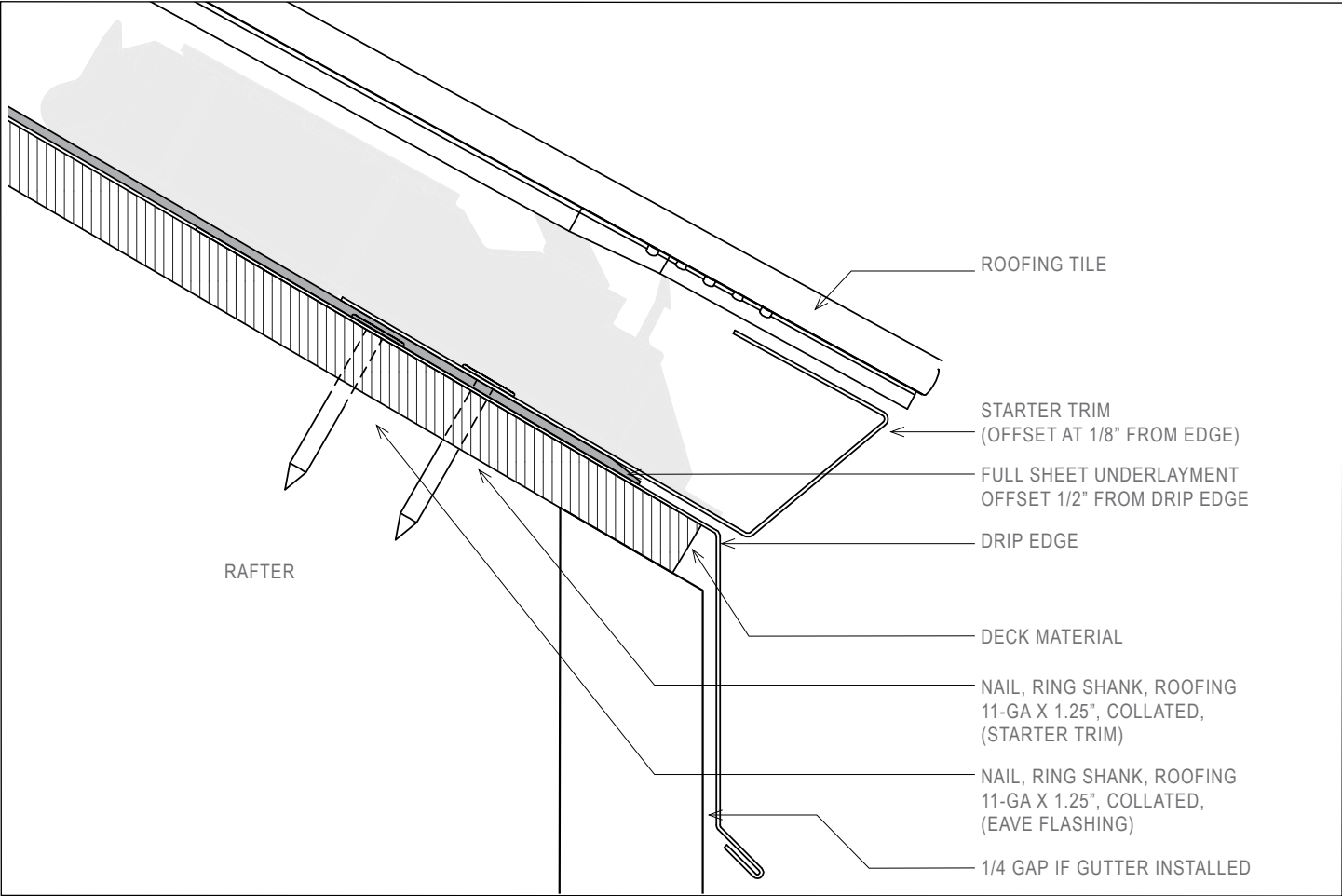
Overlap the next section of the underlayment creating a 6" endlap.



Install the next course, ensuring a 3 minimum headlap. The endlaps between rows of underlayment shall not align vertically, and the recommended minimum stagger is 24".



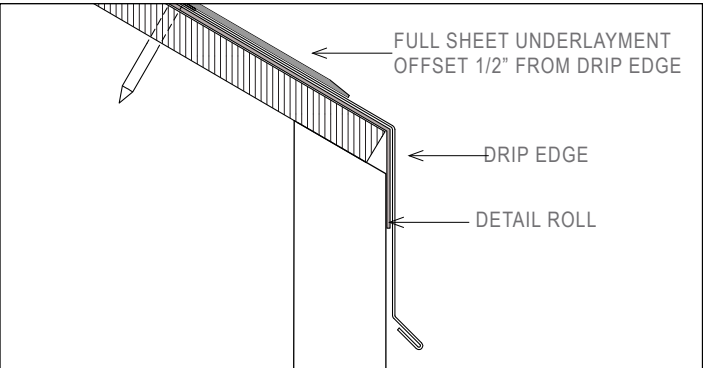
UNDERLAYMENT | EAVE AND STARTER TRIM CROSS SECTION



First course

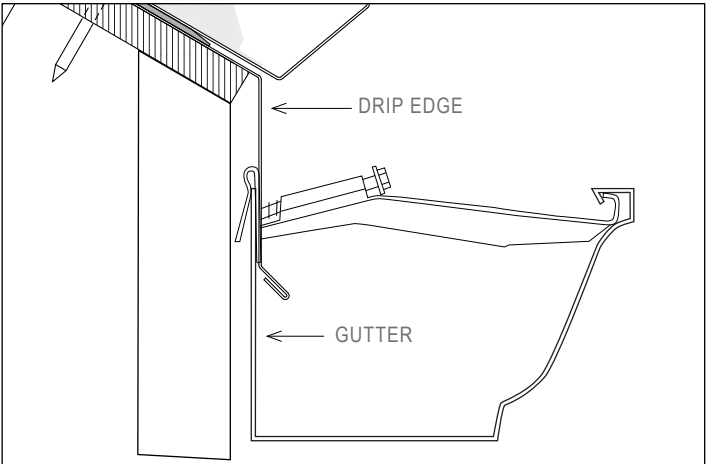
When nailing eave drip edge and starter trim along exposed overhangs, fasten on the rafters to prevent blowout of the boards and exposing protruding roofing nails. Screws (#8 – 3/4" 1460512-00-A) can be an alternative solution if difficult to locate the rafters with nails.

Ice Dams Protection Detail



In areas that see ice dams in their gutters, it is recommended that you also install the detail roll under the drip edge and over the edge 1"

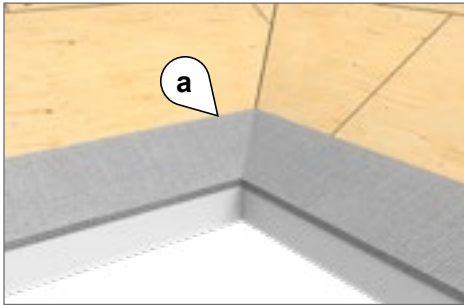
Gutter Detail



UNDERLAYMENT | AT EAVE/EAVE VALLEY

Apply underlayment to valleys in this order:

1. Install Eave Drip Flashing.
2. Lay down a full roll of underlayment centered in the valley.

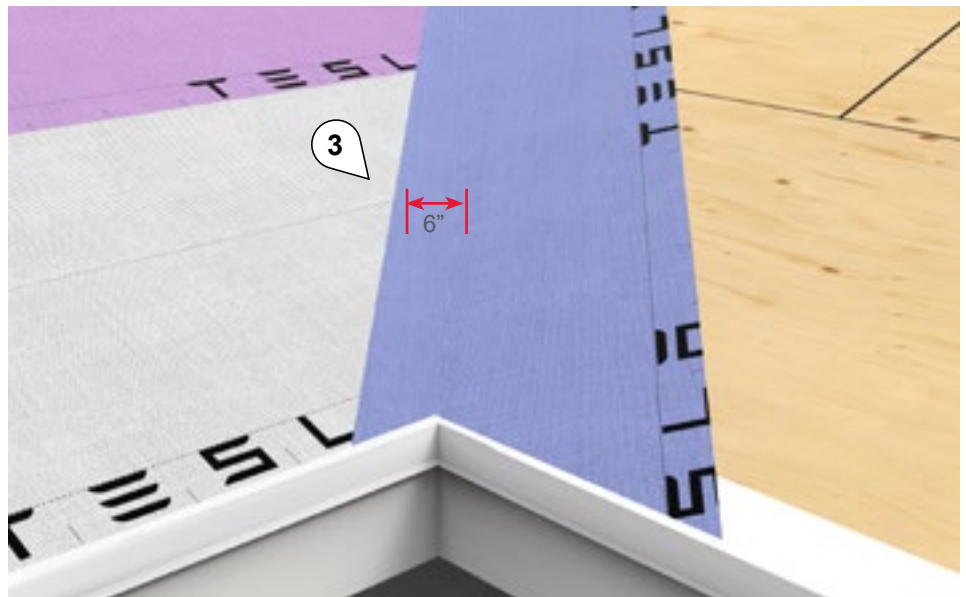
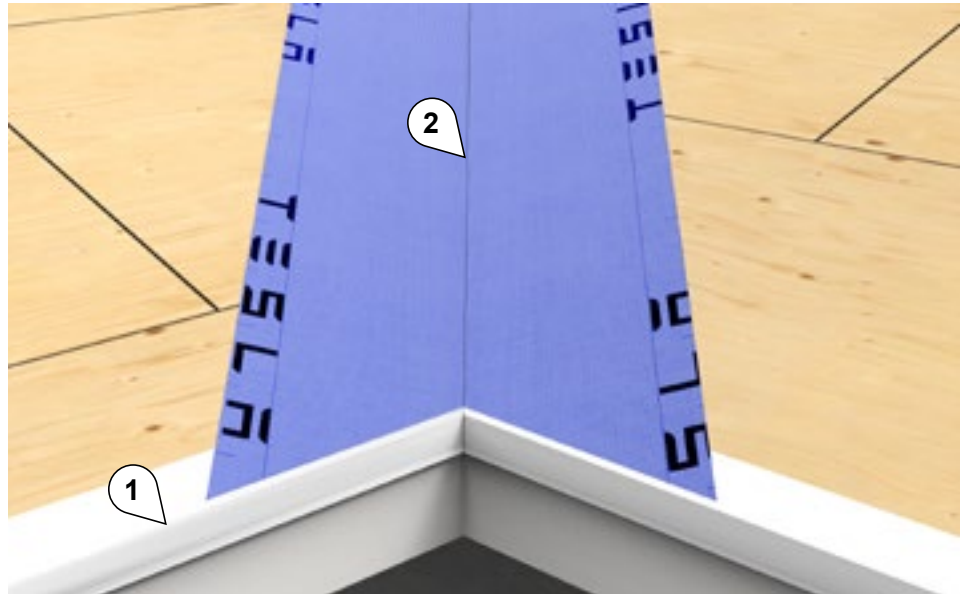


Note: In areas that see ice dams in their gutters, install a detail roll along the eave extending down onto the fascia board 1" before installing the drip edge along the eave.

3. Each row of underlayment shall overlap the valley underlayment and carefully cut back from the valley center by approximately 6".

Do not cut through to the valley underlayment.

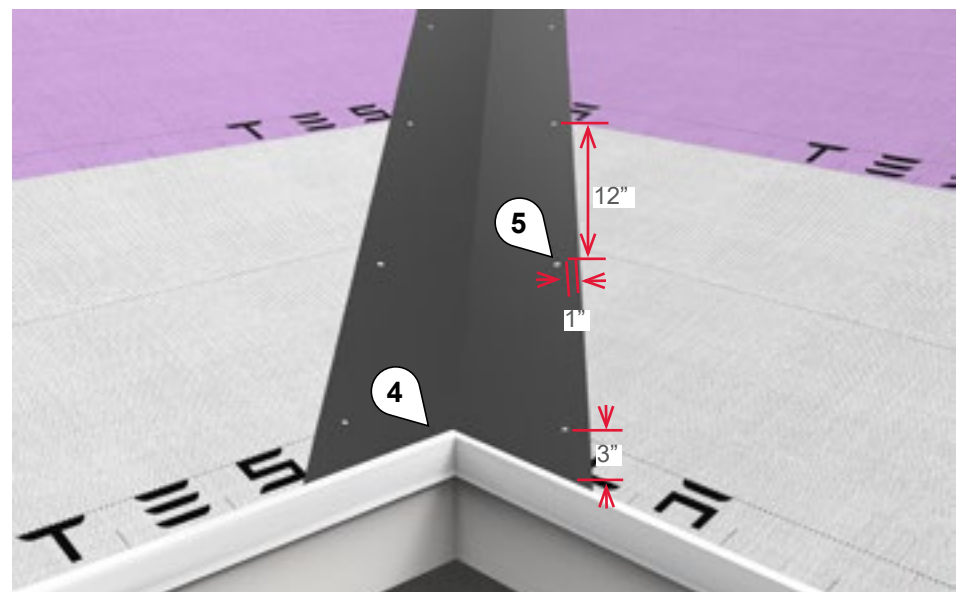
ProTip: Place a sheet of coil stock under the section of underlayment that will be cut along the valley to prevent accidental cutting through to the valley underlayment.



4. Bend your metal valley flashing to the proper pitch, scribe the eave, and cut the lower edge.

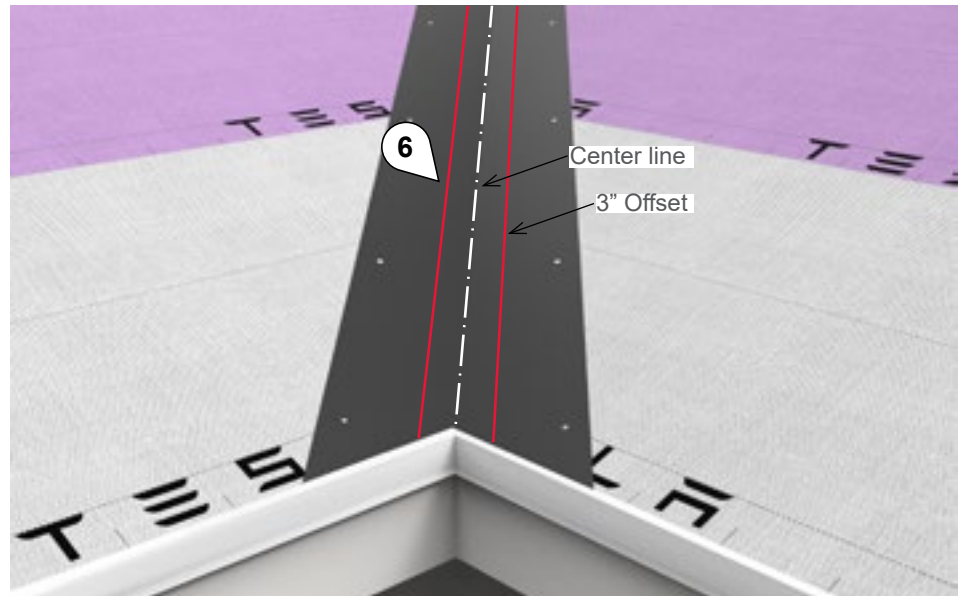
ProTip: Add 1" to the scribe and hem the bottom edge for a cleaner look.

5. Fasten the valley pan 1" from the outer edge and 12" up the valley. The first fastener should start 3" up from the drip edge.

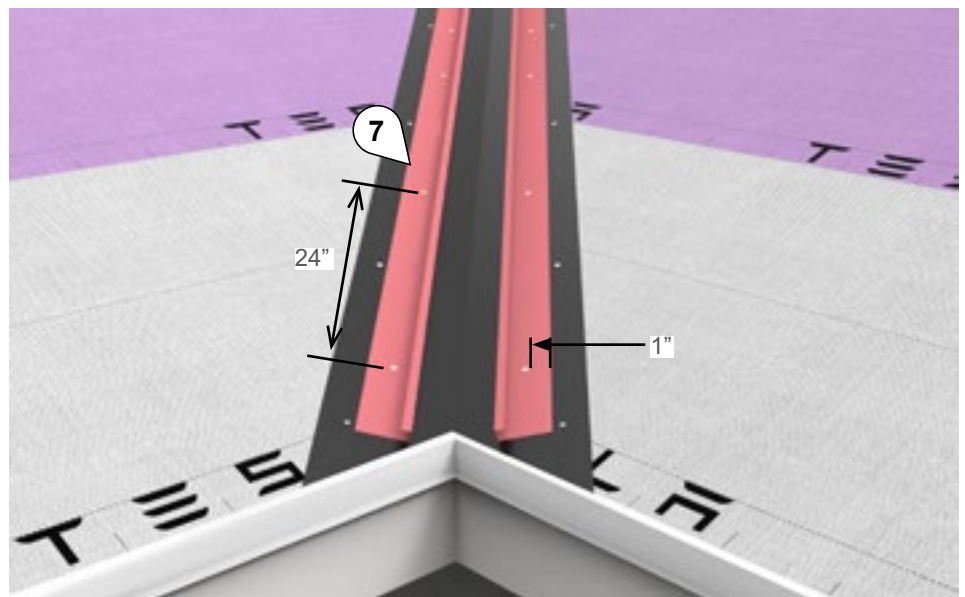


UNDERLAYMENT| AT EAVE/EAVE VALLEY

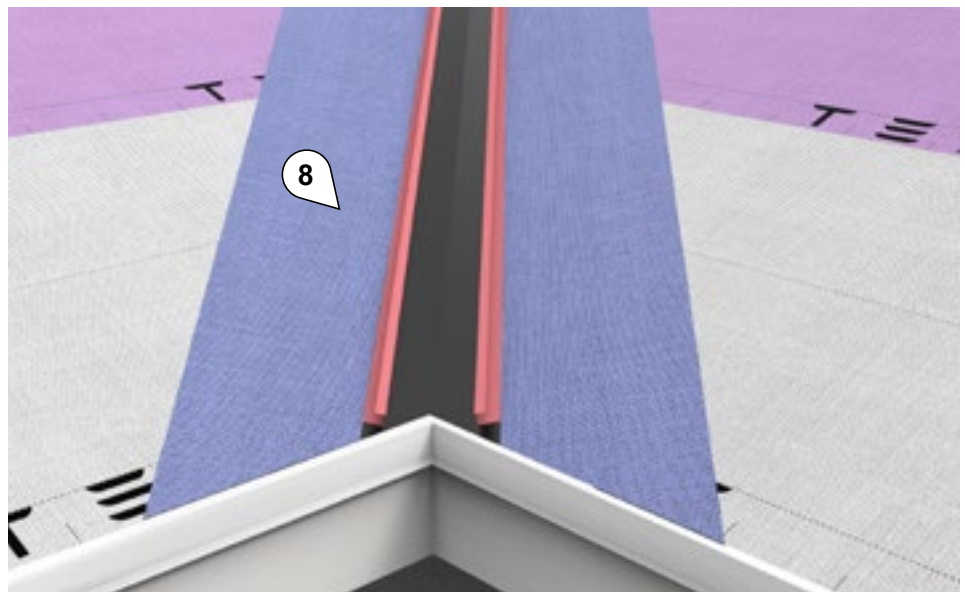
6. Snap a line 3" away from the valley center line and install the C-Channels on both sides, providing a 6" open valley.



7. The C-Channels shall be placed along the chalk line 3" away on each side. They are fastened 1" from the outer edge and 24" up the valley.



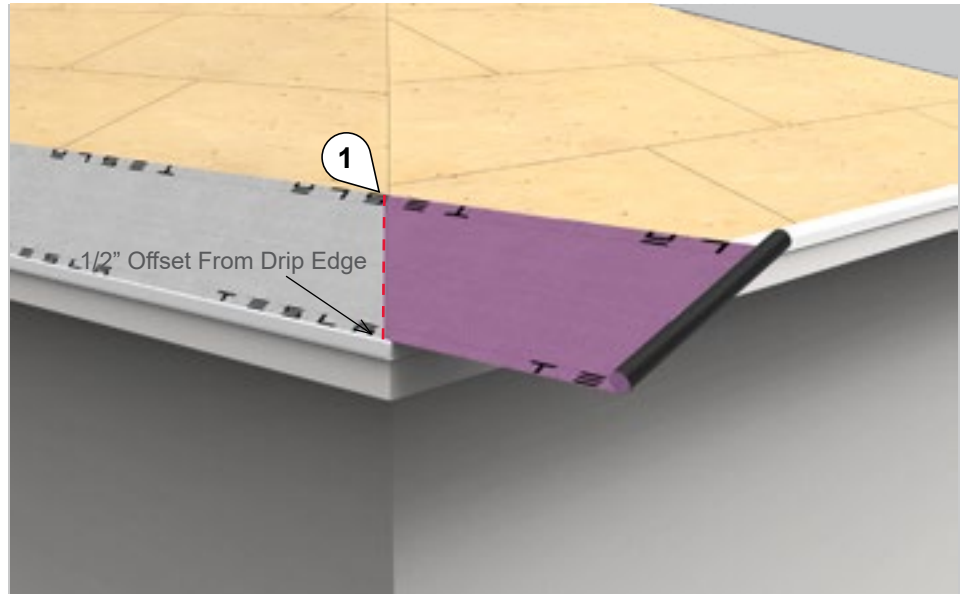
8. Strip-in the C-Channel and valley pan covering the fasteners and C-Channel.



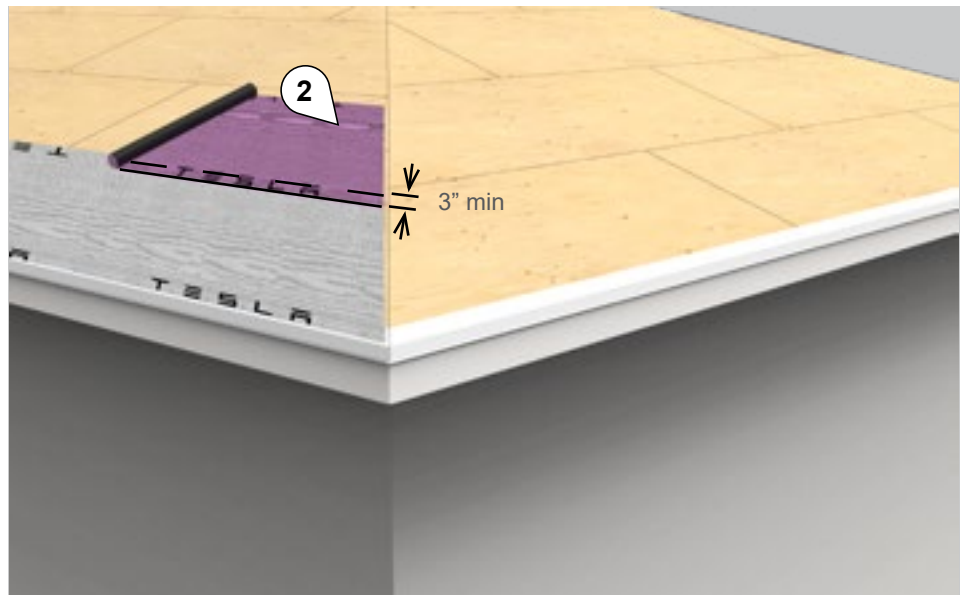
UNDERLAYMENT | AT HIP

Place the first full roll course of underlayment 1/2" away from the drip edge flashing, cutting along the hip line (1).

Pro-Tip: Flip the roll and begin installing the underlayment across the row above in the opposite direction. This is the most efficient use of underlayment as it reduces waste from cutting triangles each row. For details check out this video clip: [Cutting Underlayment Efficiently](#).

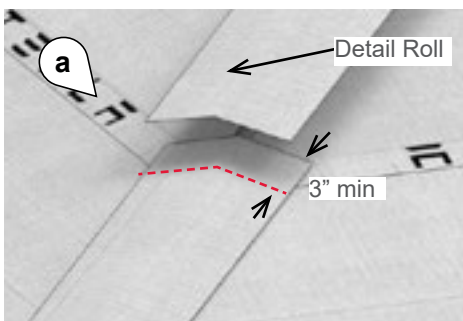


Overlap the underlayment below by 3" and continue down the row maintaining the minimum 24" offset from the end laps of the row below (2).

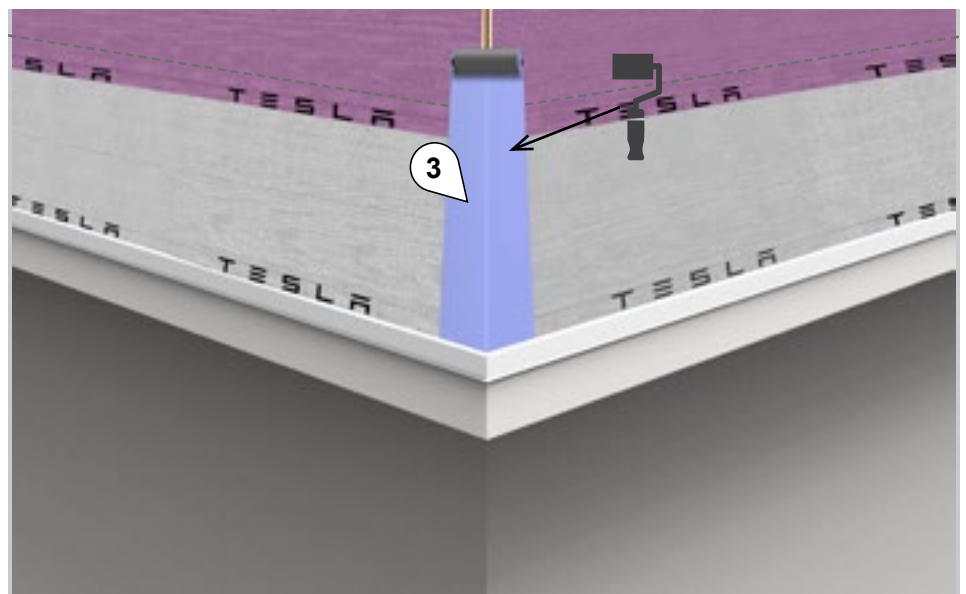


Once both mounting planes are complete, a detail roll to cap the hip shall be used and any endlap shall overlap a minimum of 3". (a).

Note: It is important to use the hand roller to ensure the detail roll has an adequate bond to the underlayment.

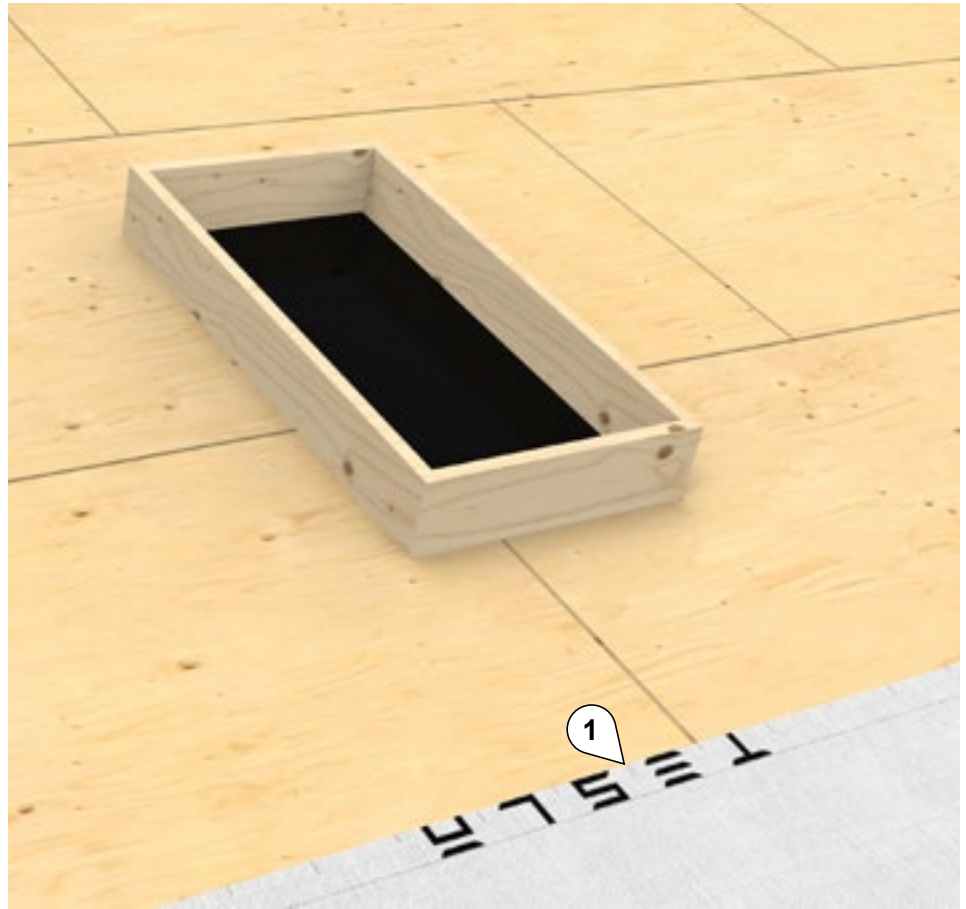


Example of Detail Roll Endlapped

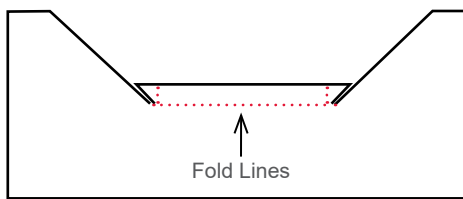


UNDERLAYMENT| AT SQUARE OBSTRUCTIONS

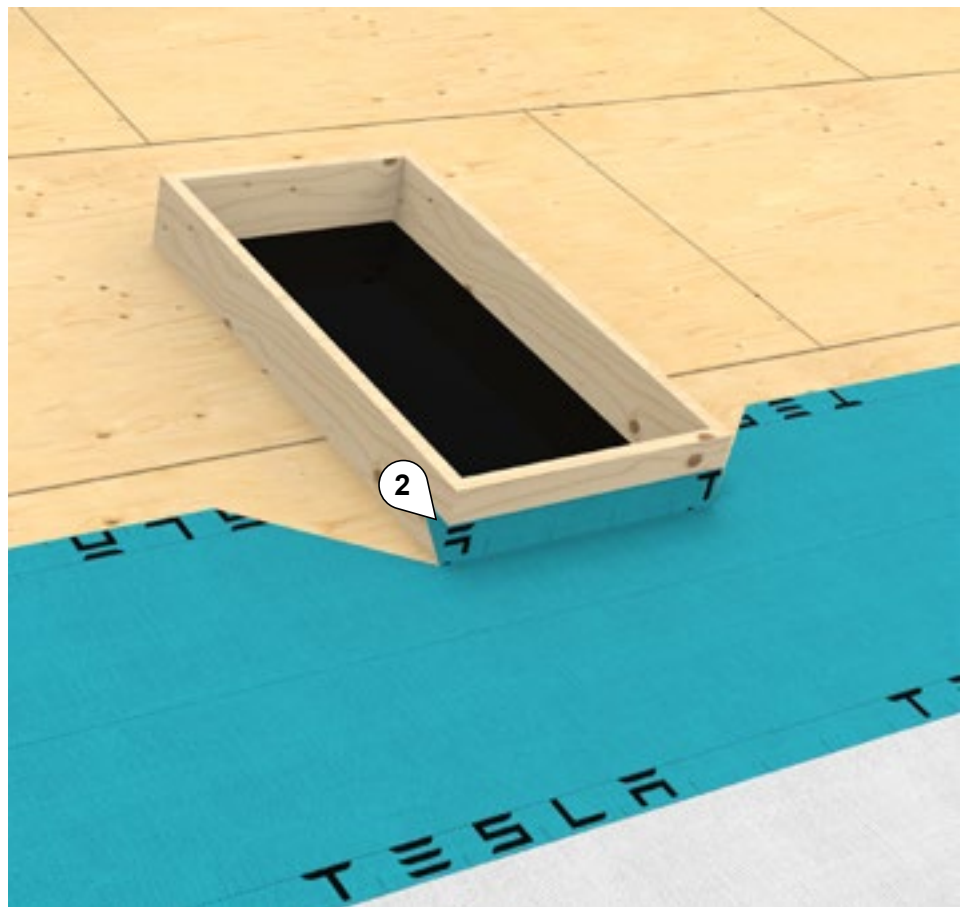
1. Skylights and other square obstructions require the underlayment to be turned up a minimum 3" along the headwall, sidewall, and endwall.



2. The headwall turn up shall extend a min of 3" up the face. Note the corners cut at approximately 45° angle.



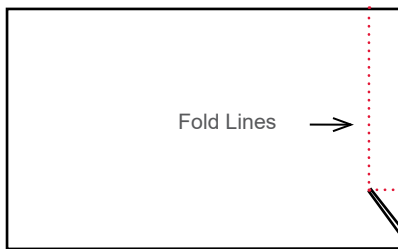
Top View of Underlayment Cut



UNDERLAYMENT| AT SQUARE OBSTRUCTIONS

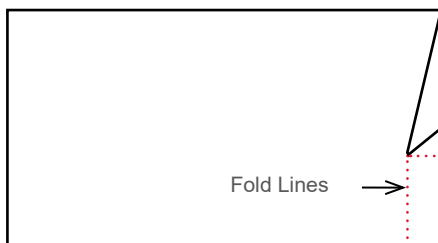
- When installing the next row of underlayment, ensure the underlayment below is overlapped a minimum of 3". The underlayment along the sidewall of the skylight shall be turned up a minimum 3". Ensure the underlayment is tight to the corner by folding at the turn up.

ProTip: Tesla's underlayment will not stretch into the inside corner so pay special attention to getting the underlayment installed tightly into the corner or run the risk of leaving a large radius that will make it difficult later to install the skylight flashings flush against the wall.



Top View of Underlayment Cut

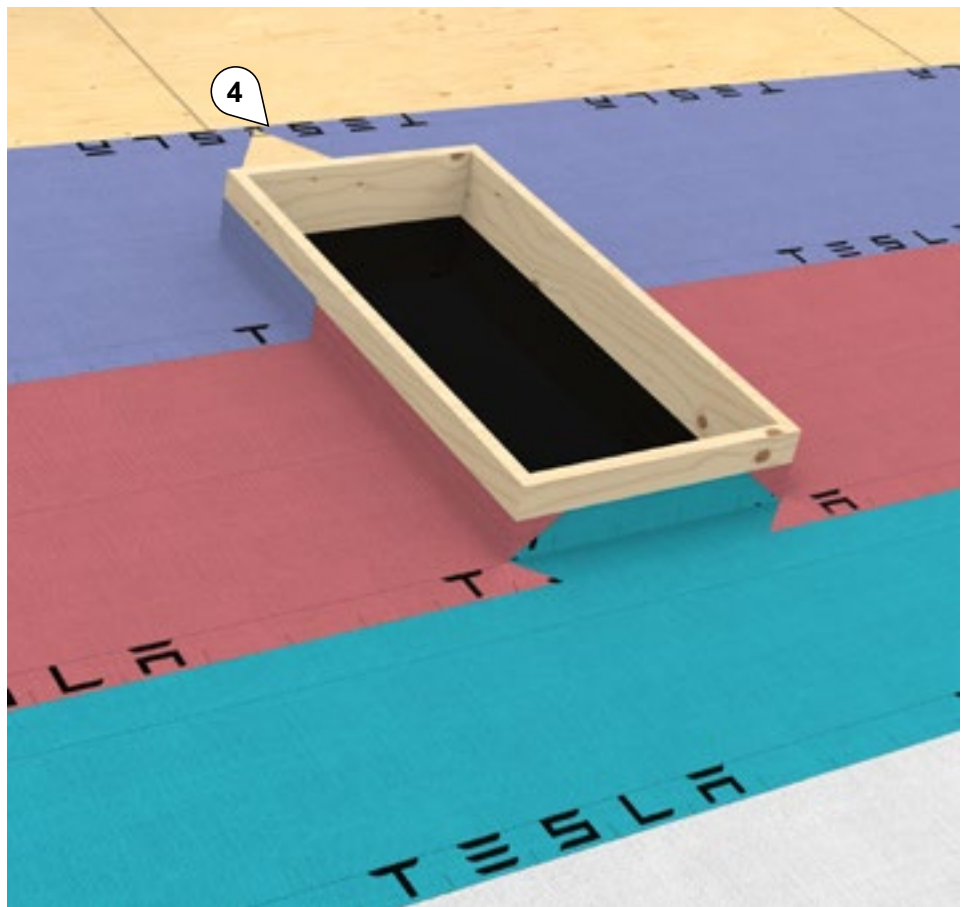
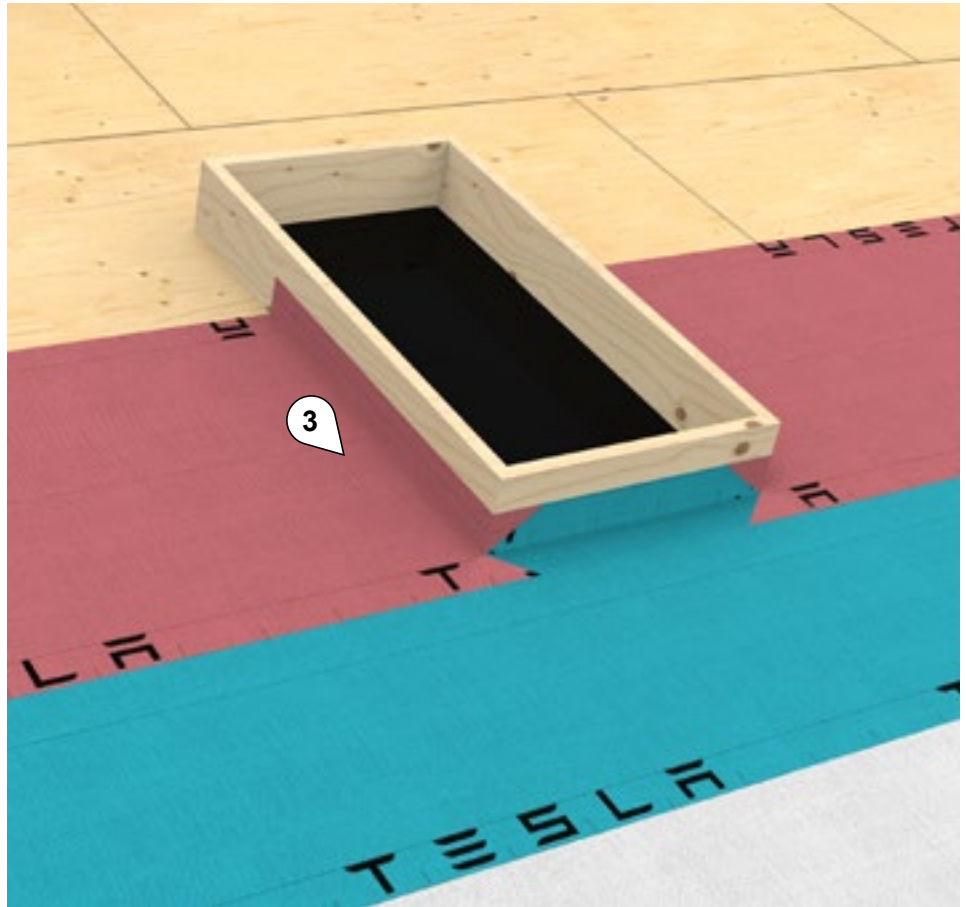
- When you reach the endwall, ensure the corners are wrapped a min of 3". If you are unable to span the whole section of underlayment across the obstruction, you maybe need to break it up into sections.



Top View of Underlayment Cut

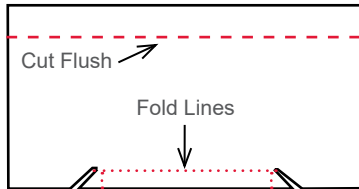


Endwall Example from Up Roof



UNDERLAYMENT| AT SQUARE OBSTRUCTIONS

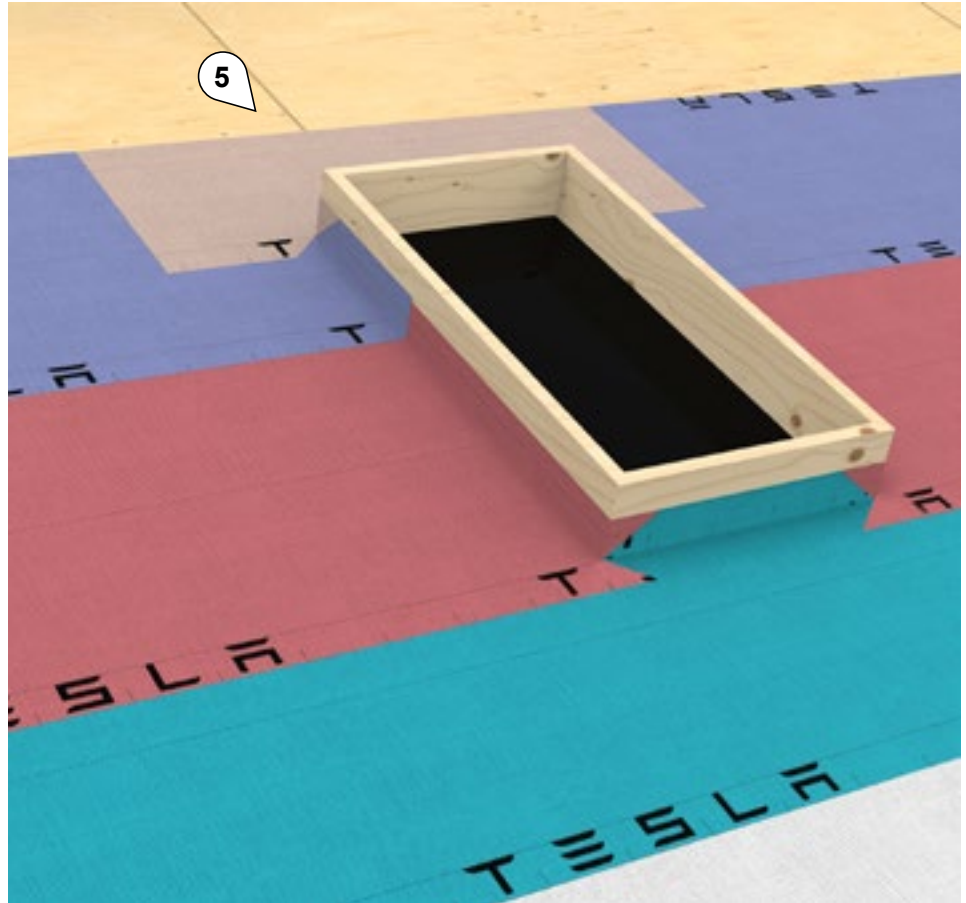
5. When reaching an endwall, use a patch of underlayment that extends approximately 16" on either side of the skylight and install the underlayment, turning it up the endwall a minimum 3". Ensure the patch is cut flush with underlayment course below.



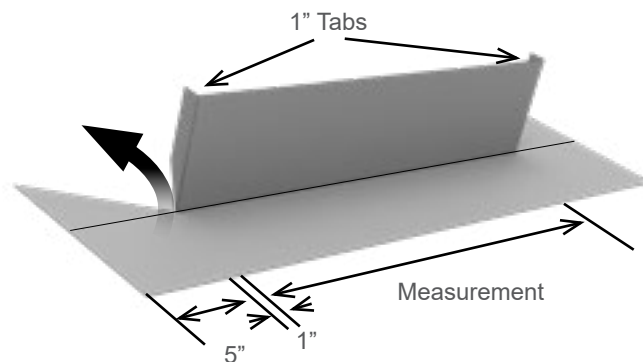
Top View of Underlayment Patch



Endwall Example from Up Roof

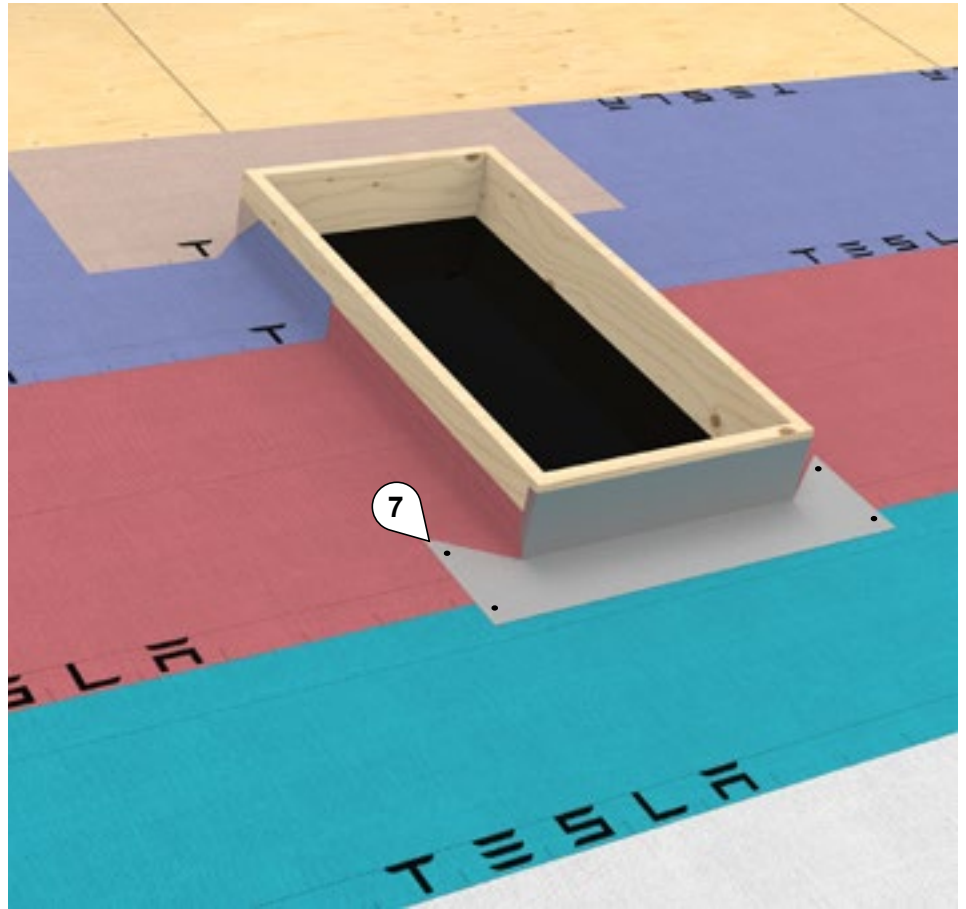


6. 1. Measure headwall.
2. Add 12" to extend past each corner.
3. Hold the headwall into place, centering so that 6" extends past each side of skylight, and scribe 1 corner as building is often not square.
4. Cut 45 degrees from bottom of line outward on vertical portion of metal.
5. Bend down excess metal on outer edge flush to the deck.
6. Add 1 inch to line for tab and bend 90 degrees.
7. Hold headwall pan in place to scribe opposite side and repeat steps 4-6.



UNDERLAYMENT| AT SQUARE OBSTRUCTIONS

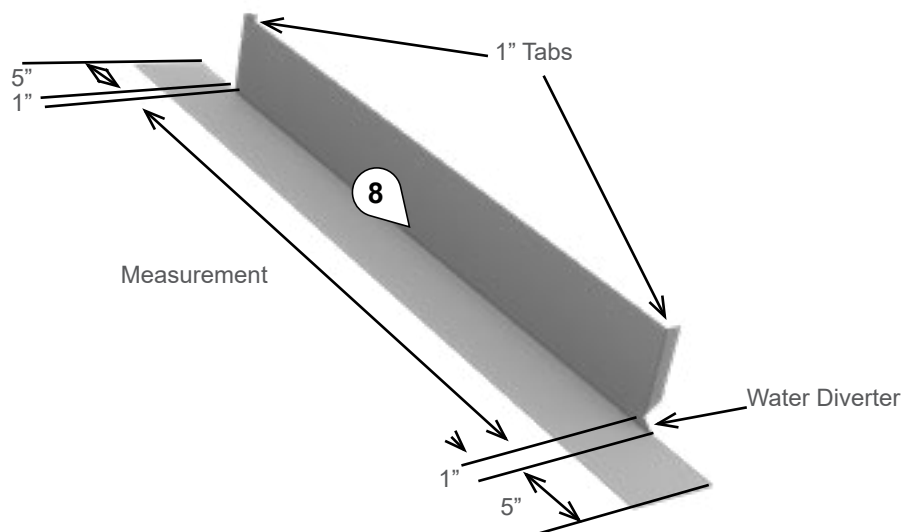
7. Secure the headwall flashing to the deck by adding the appropriate fasteners 1" away from each edge at the corners.



8. 1. Measure length of sidewall.
2. Add 12" to extend past headwall and endwall corners.
3. Hold sidewall into place, centering so that 6" extends past each side of skylight, and scribe 1 corner as building is often not square.
4. Add 1 inch to line for tab and bend 90 degrees.

PRO TIP: Scribe and bend endwall tab first for easier work at the headwall.

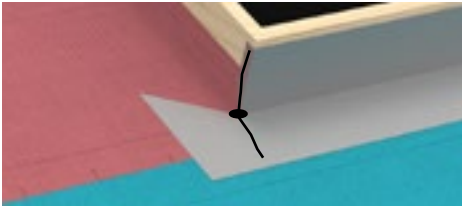
5. Scribe line at the headwall and add 1"
6. Create a 1" tall water diverter and bend tab 90 degrees.



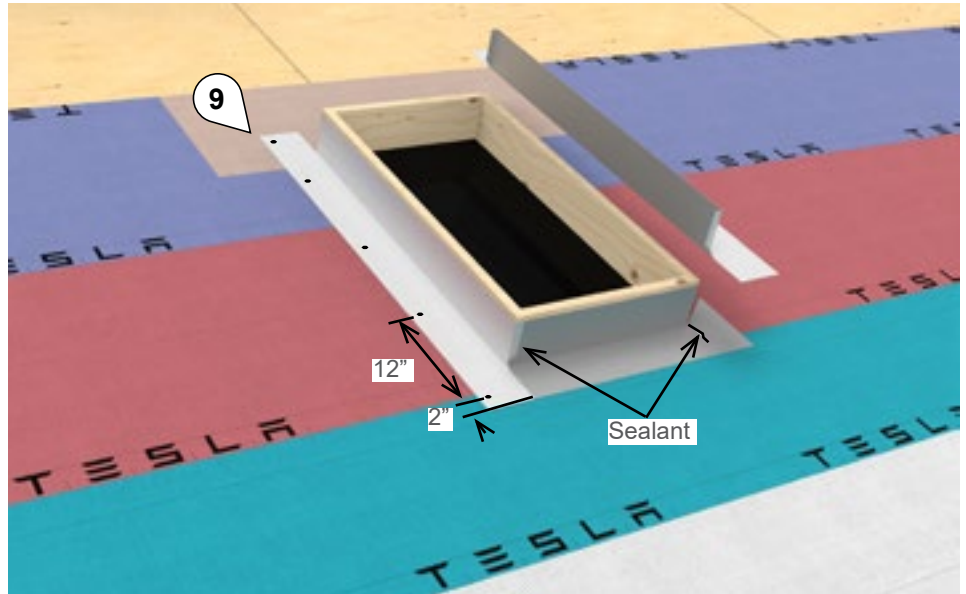
Closeup of 1" Water Diverter

UNDERLAYMENT | AT SQUARE OBSTRUCTION

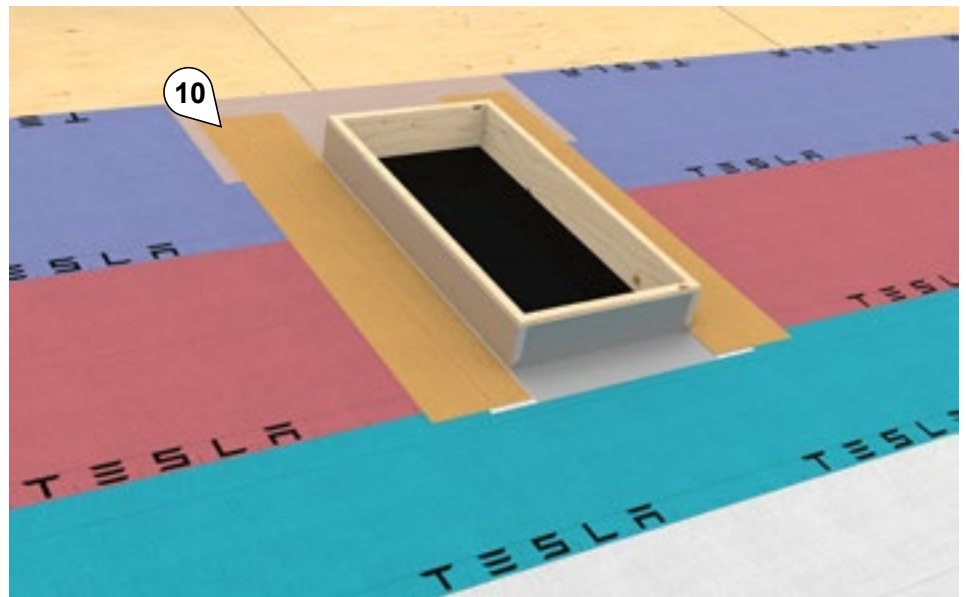
9. Add sealant to inside tab at the headwall corner and secure to the deck 2" away from the edge and every 12".



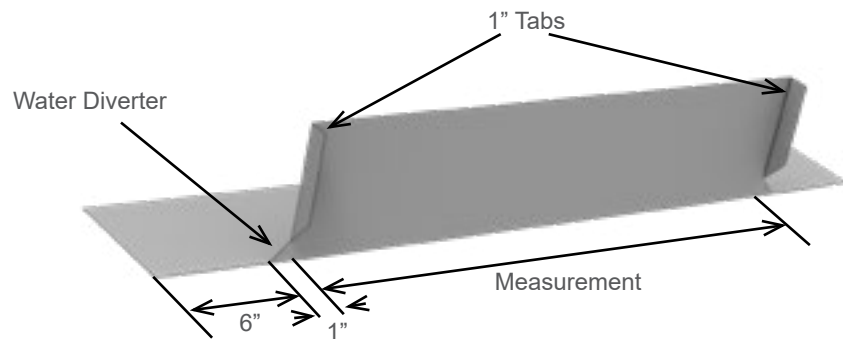
Closeup of Sealant Placement



10. Use a detail roll to waterproof the sidewall and corner apron flashing leaving 1" from the bottom of the flashing down roof and 6" beyond the sidewall end up-roof.

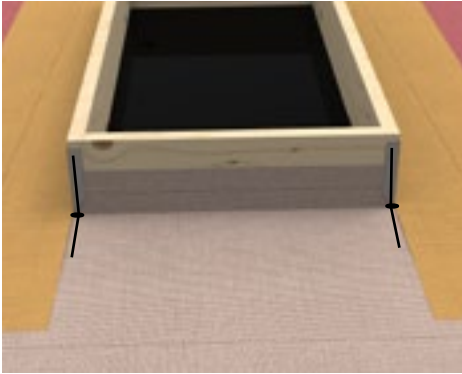


11. A. Measure out the Endwall Flashing from each corner of the endwall.
 B. Scribe 6" from the edge of the flashing plus 1" for a tab, then adding the length measurement taken at the skylight plus 1" for a tab then an additional 6" at the end.
 C. Scribe a water diverter by marking a 45° angle facing outward between the 6" marks and the endwall length.
 D. Cutout with offset Metal Snips.
 E. Fold in 1" Tabs with hand seamer.

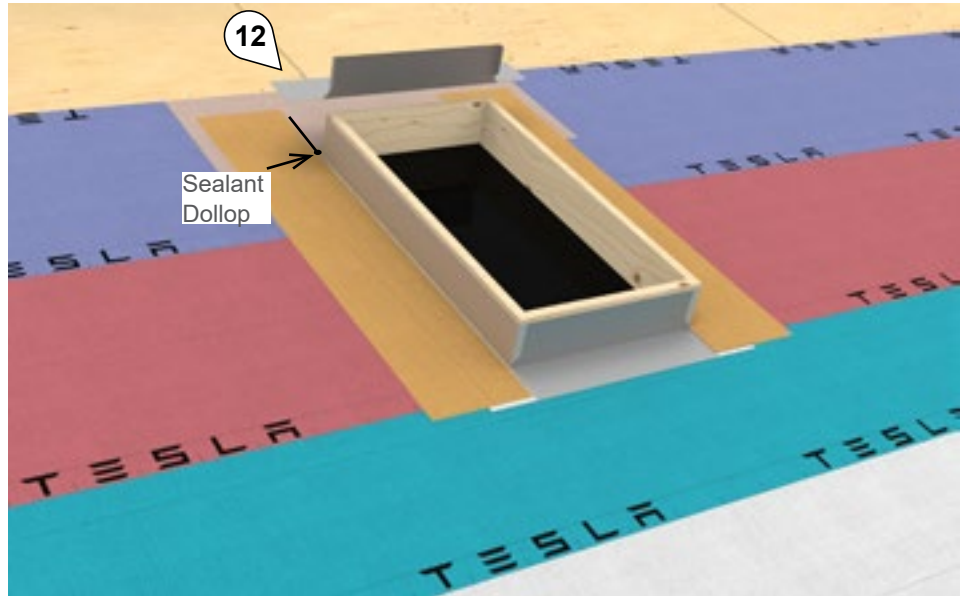


UNDERLAYMENT | AT SQUARE OBSTRUCTION

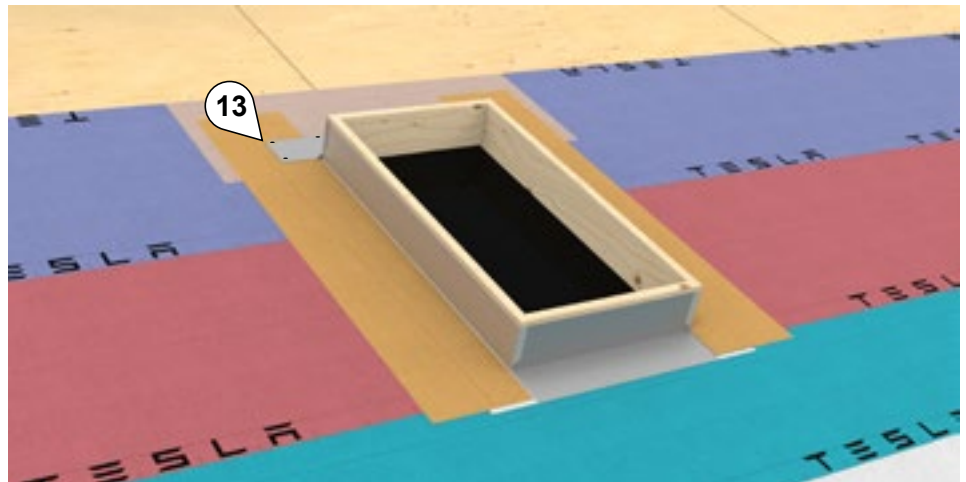
12. Place a continuous bead of sealant 1" away along the edge of the endwall and a dollop at the corners.



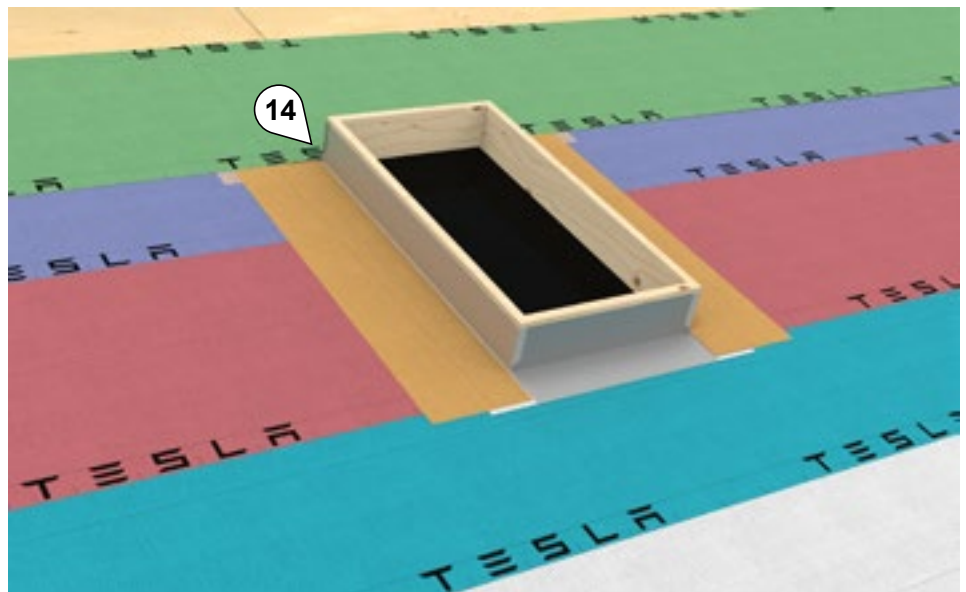
Closeup of Sealant Placement



13. Secure the endwall to the deck by placing fasteners 1" away from each edge on the top and bottom corners.

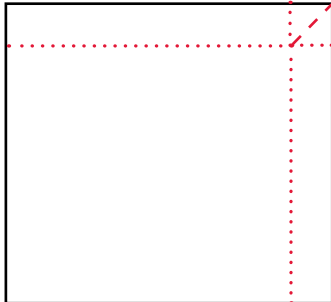


14. Cap the endwall with underlayment covering all exposed fasteners, and add a dab of sealant to the inside corner.

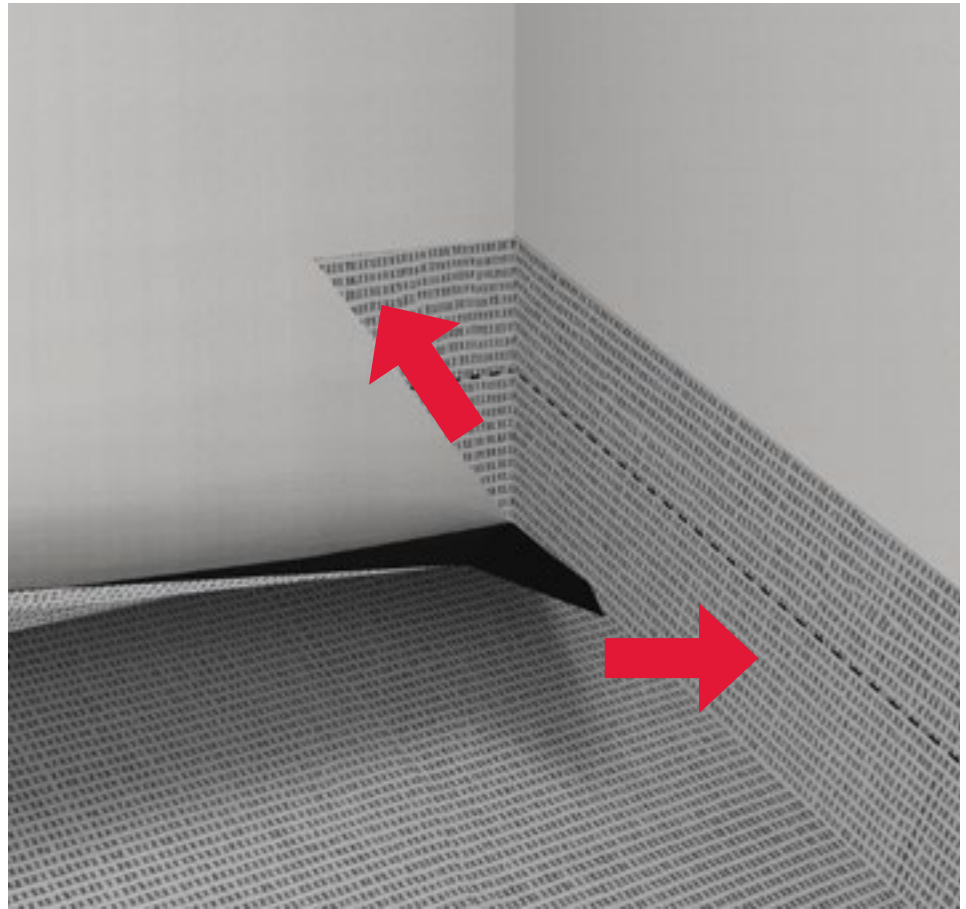


UNDERLAYMENT | AT INSIDE CORNER

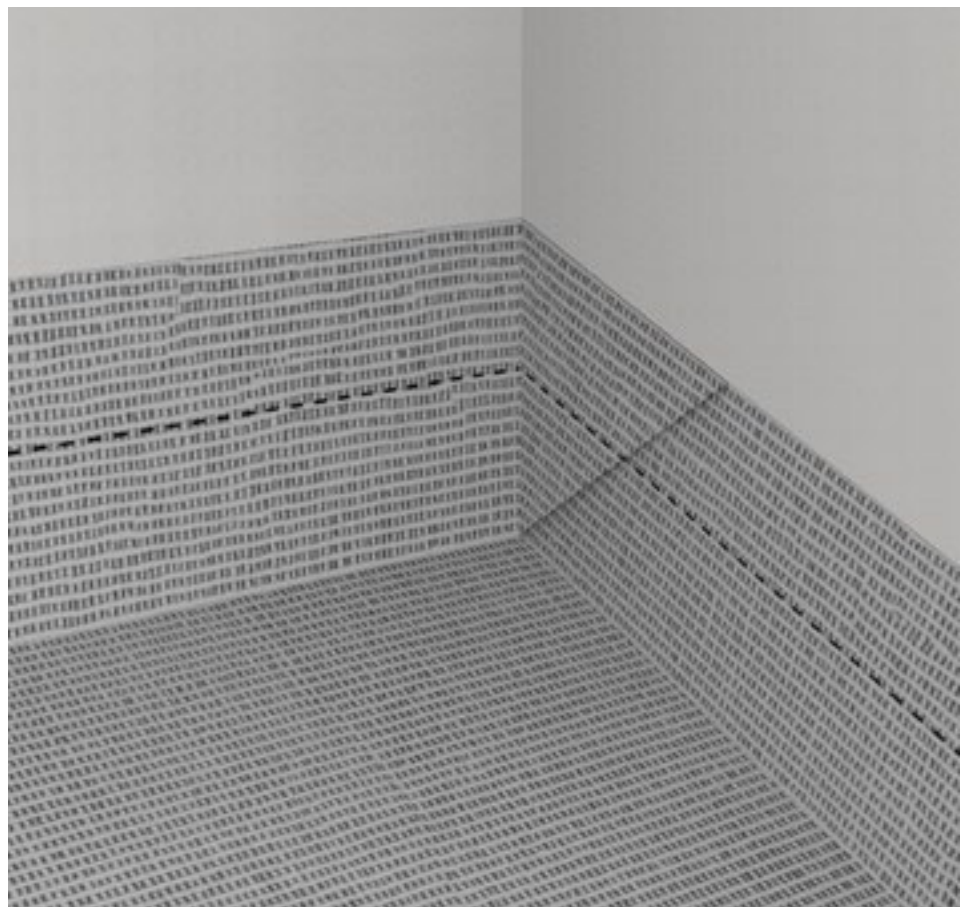
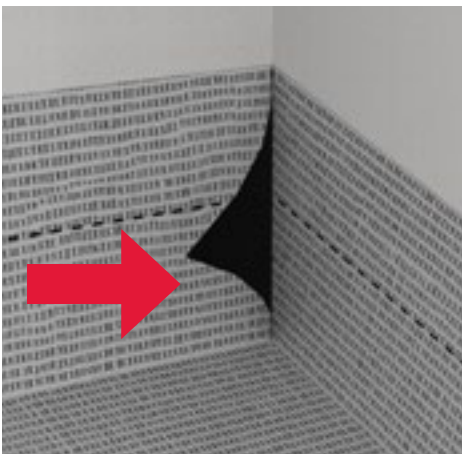
Measure out a min of 3" turn up in the corner area. Then make an angled cut at the top corner a min of 3" down. Stick the turn up onto the sidewall and the angled tab to the headwall. Use a hand roller to get a clean edge.



Top View of Underlayment Cut



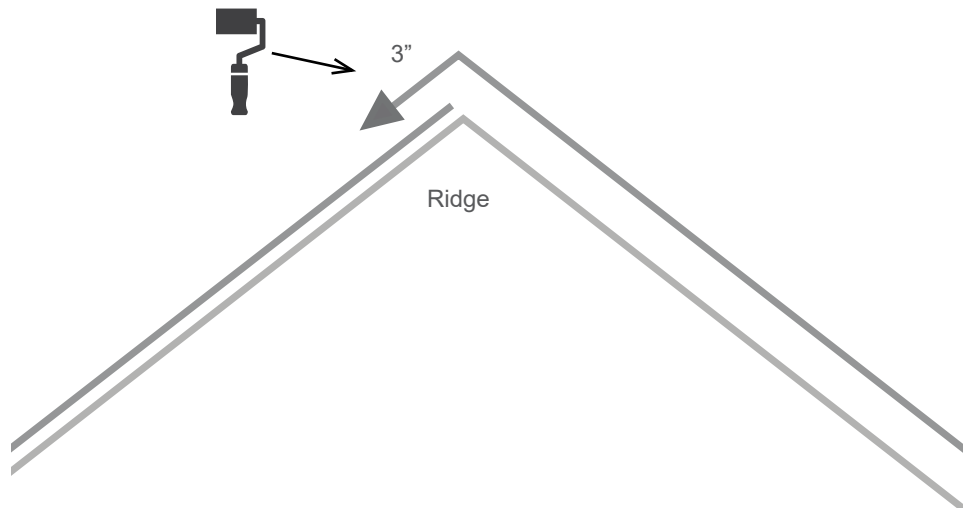
Place the headwall turn up tab over the sidewall and push in evenly to ensure it's sealed at the corner.



UNDERLAYMENT | AT RIDGE

Overlap ridge with 3" of underlayment. This will seal the ridge vent temporarily in case of inclement weather.

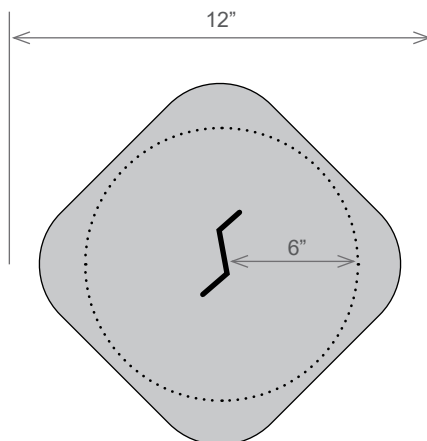
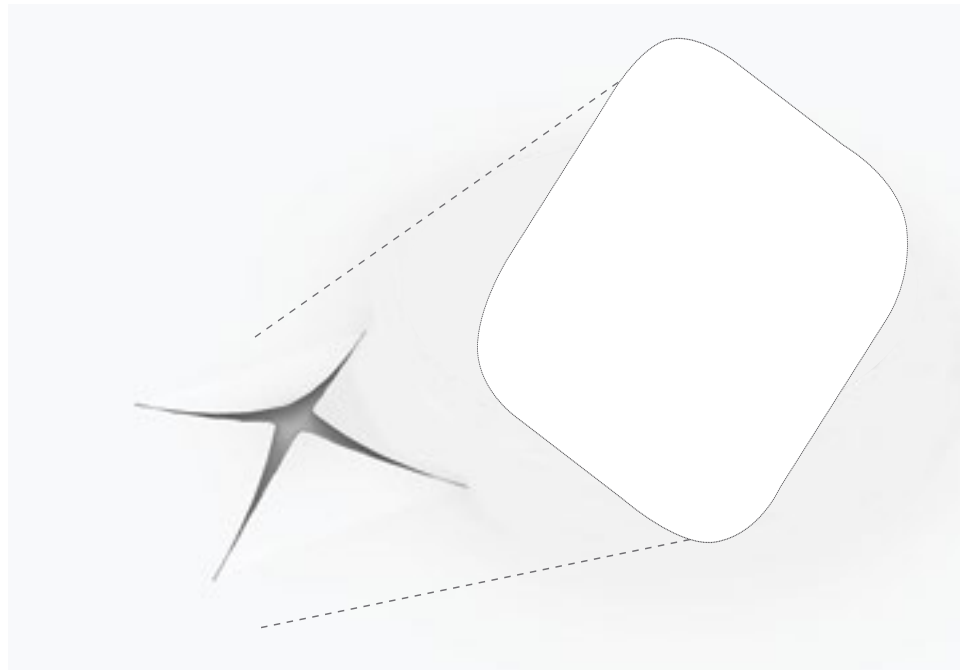
Note: It is important to use the hand roller to ensure the detail roll has an adequate bond to the underlayment.



UNDERLAYMENT | PUNCTURES, TEARS, AND PATCHES

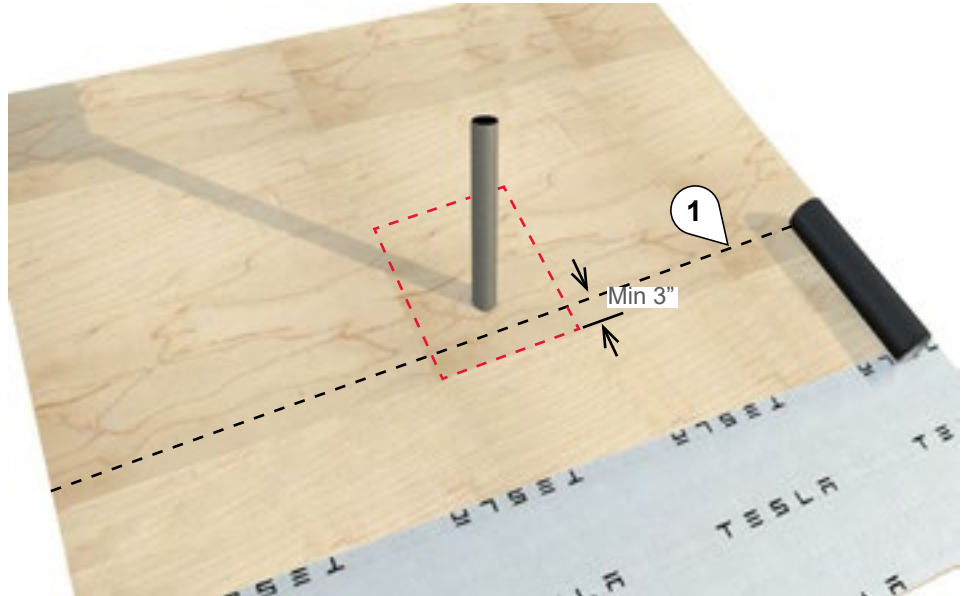
If you need to apply a patch:

- Cut the patch in a rectangle shape then orient in a diamond-shape on mounting plane to help shed water.
- Round or cut corners at 45° to prevent peeling.
- Make the patch large enough to extend a min of 6" beyond the perimeter of the hole or tear.
- Clean the area of any dirt or debris with an airline or brush.
- Roll out patch with hand roller



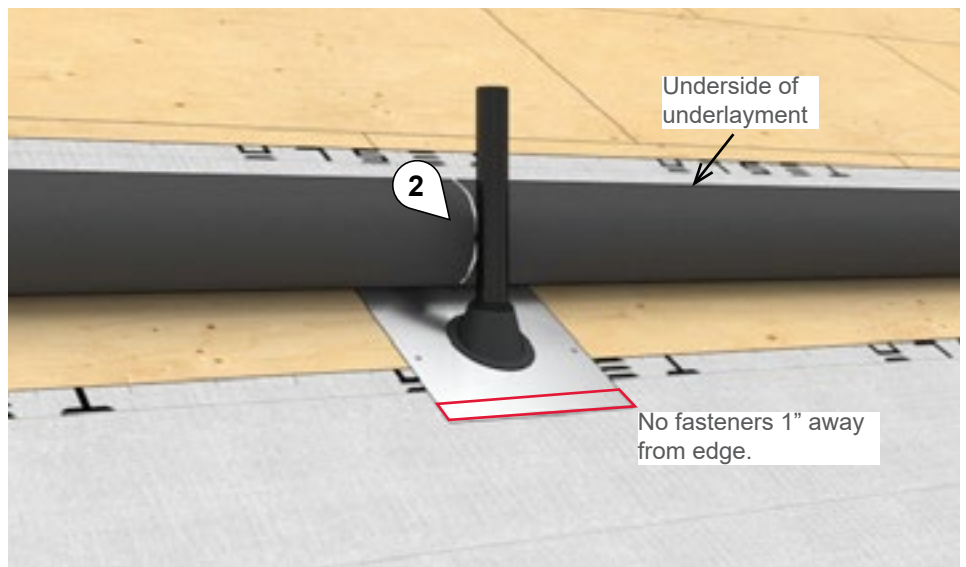
UNDERLAYMENT | AT ROUND OBSTRUCTION

1. Test fit and mark out where the new deck level pipe flashing will sit. Install the underlayment courses until the last course overlaps the pipe flashing outline by a min of 3".

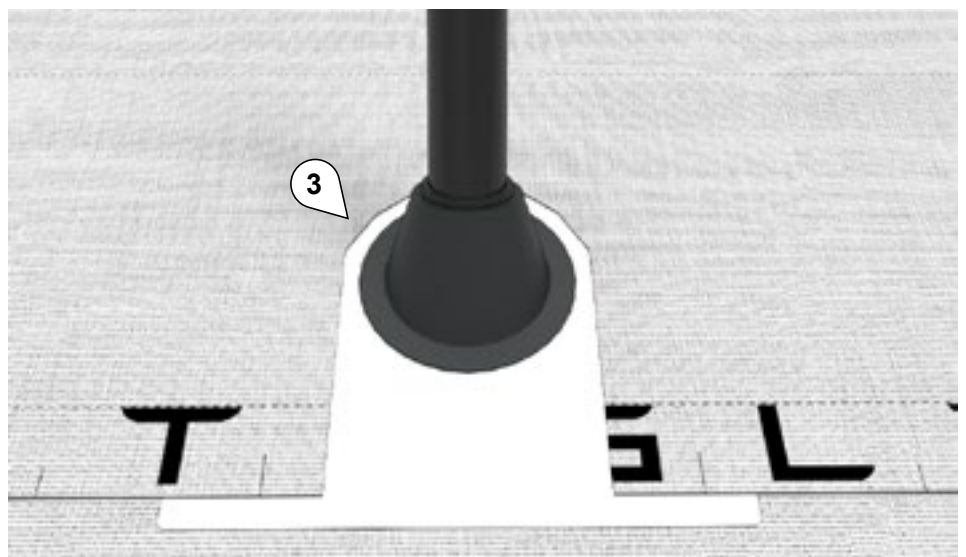


2. Secure the pipe flashing to deck with the appropriate fasteners ensuring none land 1" away from the leading edge. If the lower underlayment course ended 4" from the pipe flashing edge you can install the next course by cutting up vertically, center at the pipe flashing to the end of the underlayment. If the lower underlayment course sits past the pipe flashing, proceed to the optional steps of fabricating an underlayment bib or using the underlayment detail roll.

Note: It is best practice to integrate pipe flashings into underlayment courses whenever possible.



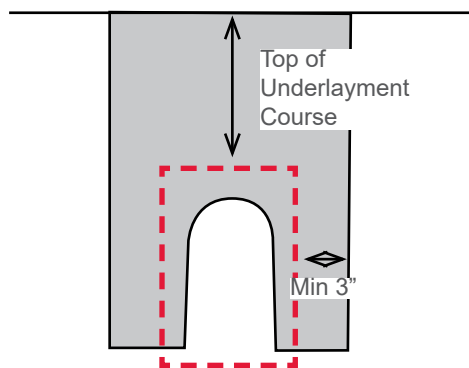
3. Next, starting at the top of the cone where the cut stopped, continue cutting up 1/2" to 1" and around the cone to make half of an upside-down U shape. Mirror this shape on the other side. Ensure the underlayment covers the fasteners on the sides of the pipe flashing.



UNDERLAYMENT | AT ROUND OBSTRUCTION

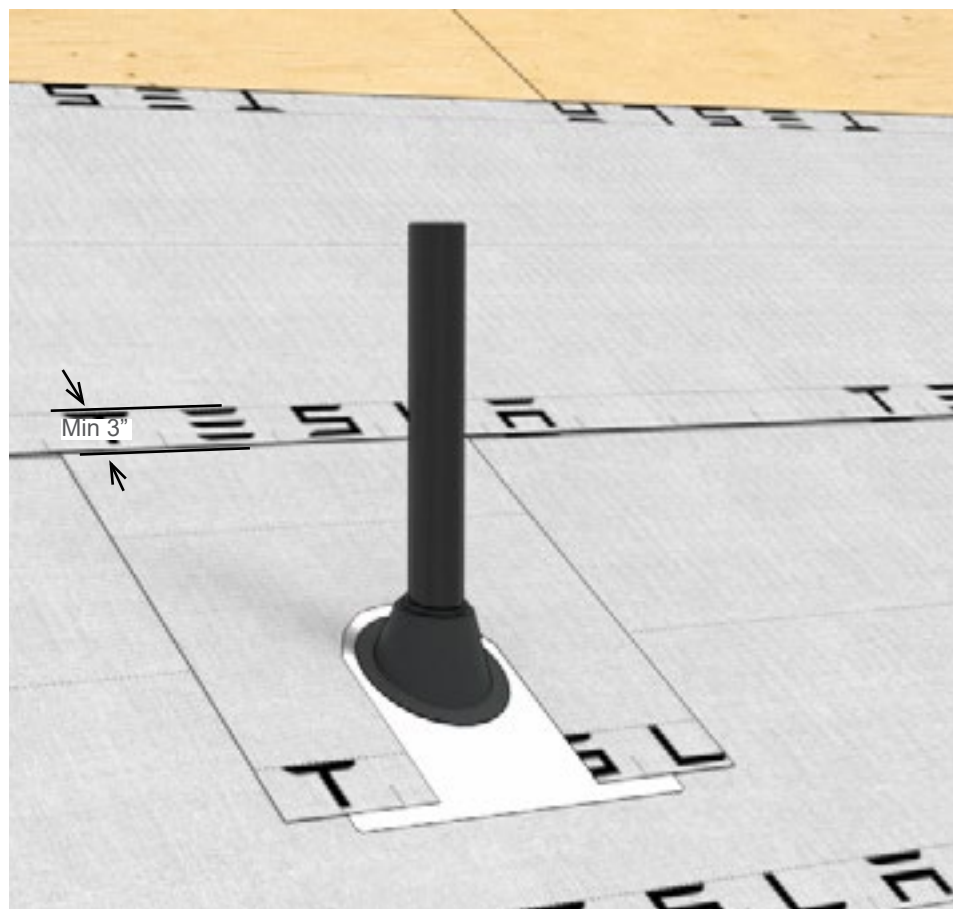
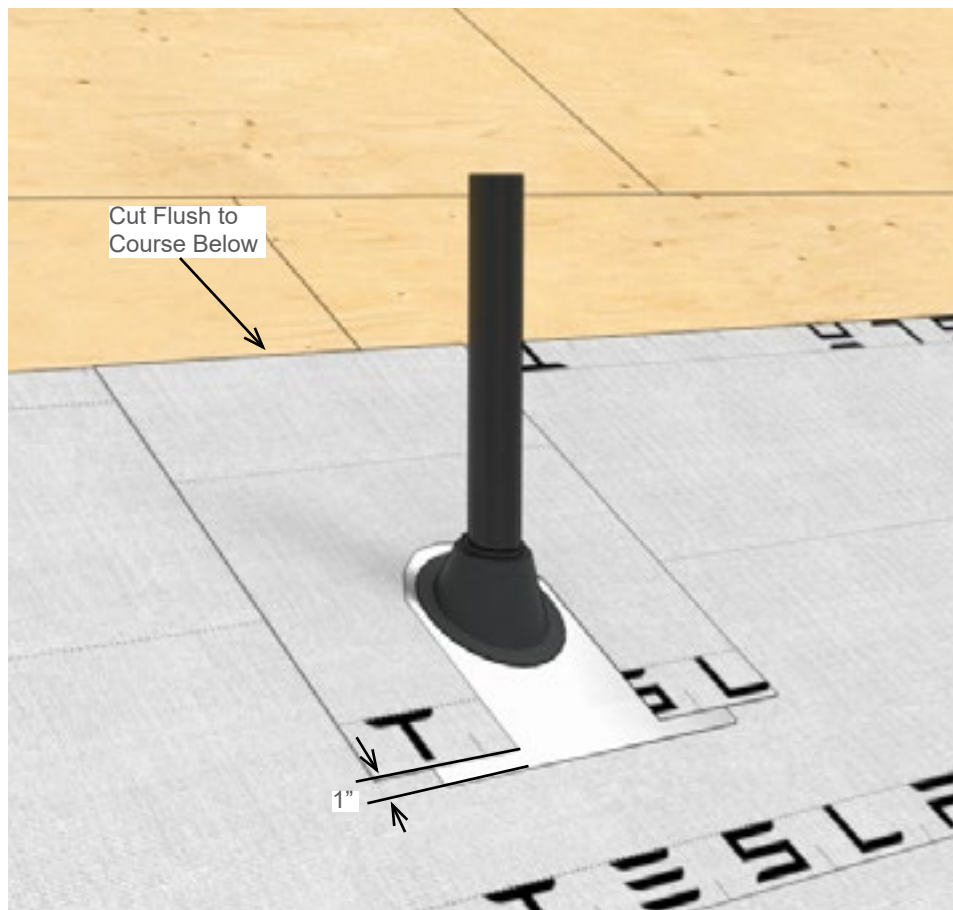
Bib Option:

1. Only do this step if your upper course of underlayment sits past the pipe flashing and does not cover the flashing fasteners adequately. Start with a workable square of underlayment, ensure each side of the bib has at least 3" min of underlayment at the sides. Lay the section over the flashing, making a relief cut above the base of the cone, then cutting a U-shape 1/2" - 1" around the base. Cut the top of the patch flush with underlayment course below.



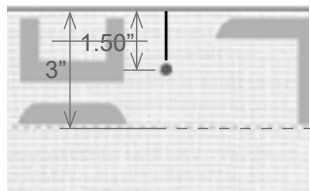
Example of Cut Logic for Pipe Bib

2. The bib is capped by the upper underlayment course, so it doesn't leave a bucking edge.

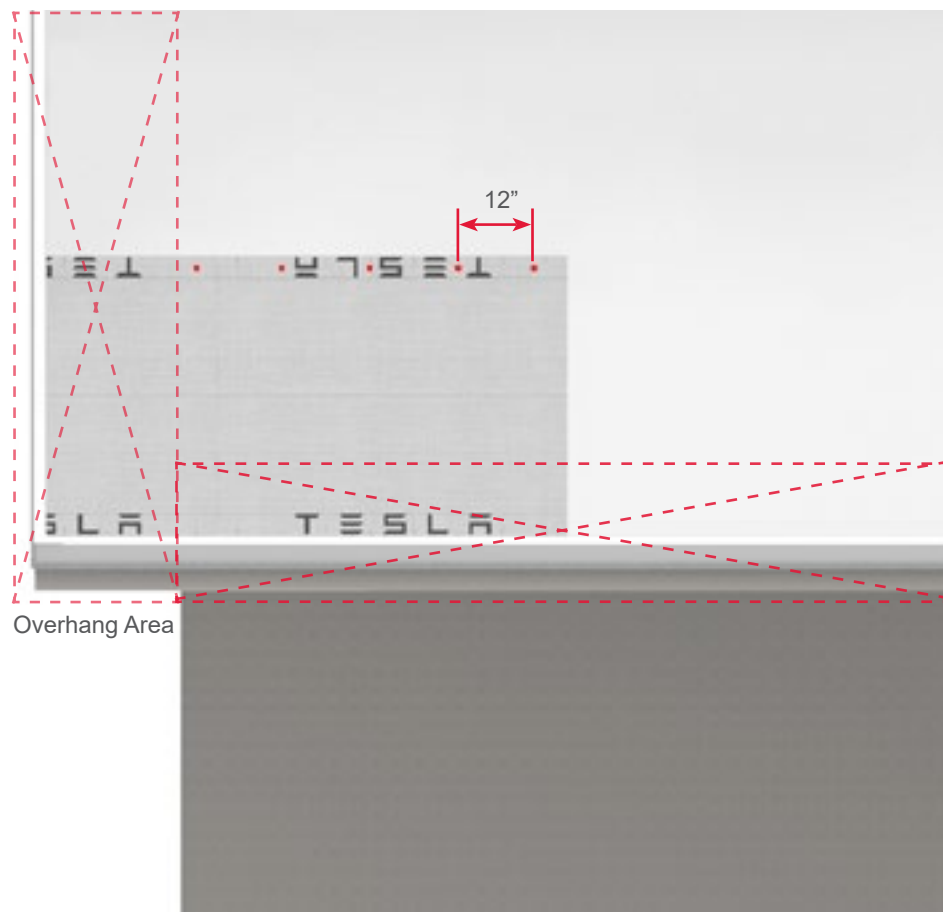


UNDERLAYMENT | BLIND NAILING FOR EXTREME CONDITIONS

Fasten every 12" on the end of the markers (each marker is spaced 6" apart) indicated on the top. Ensure to fasten into rafters when exposed soffits are present.



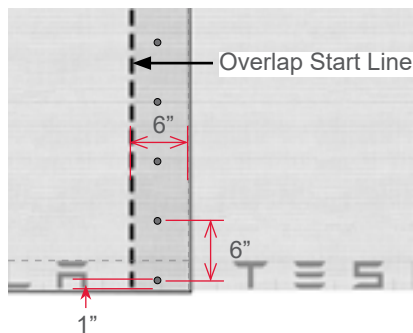
Horizontal Laps of Underlayment



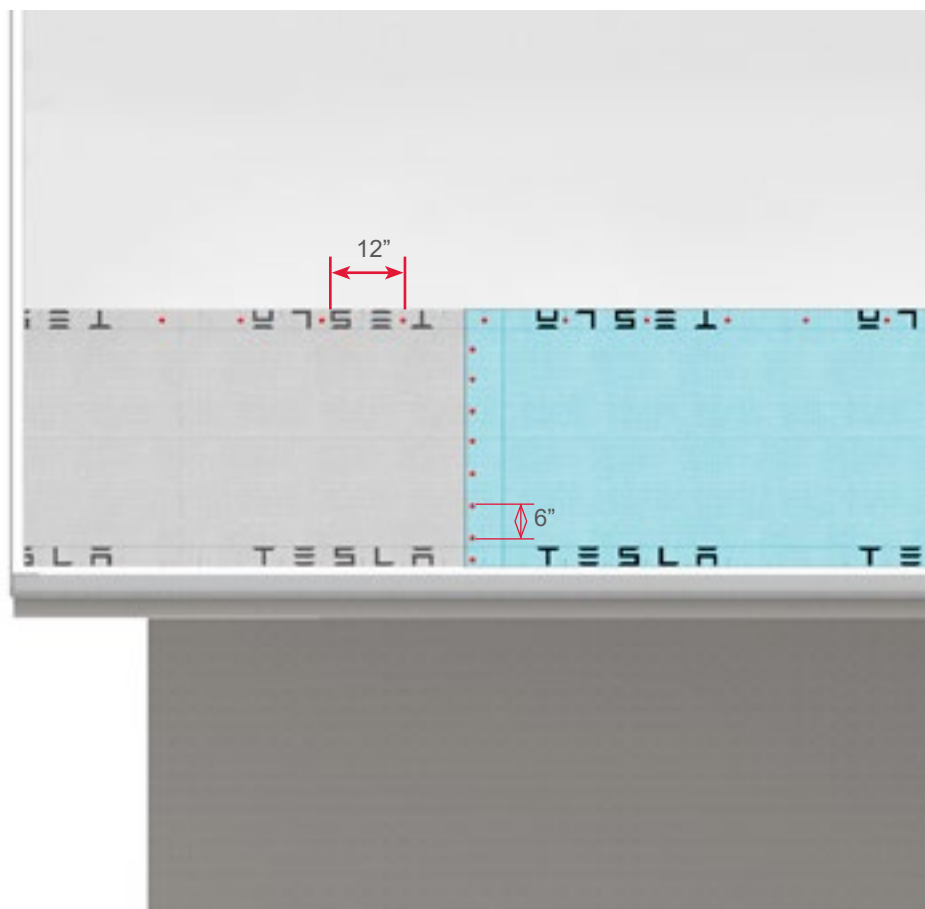
A. Overlap the next section of the underlayment 6" on top of the last section.

B. Fasten the side-lap with the first nail 1" away from each edge, and every 6" after that.

Note: Do not fasten in exposed overhang areas. Continue nailing the top-lap every 12" on the ends of the markers.



Closeup of End Laps of Underlayment

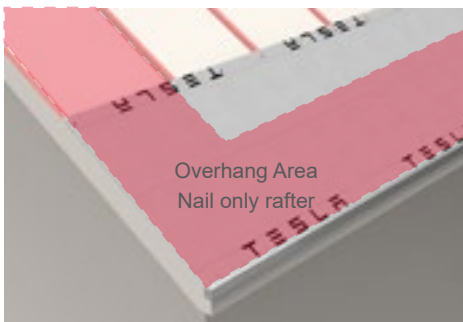


UNDERLAYMENT | BLIND NAILING FOR EXTREME CONDITIONS

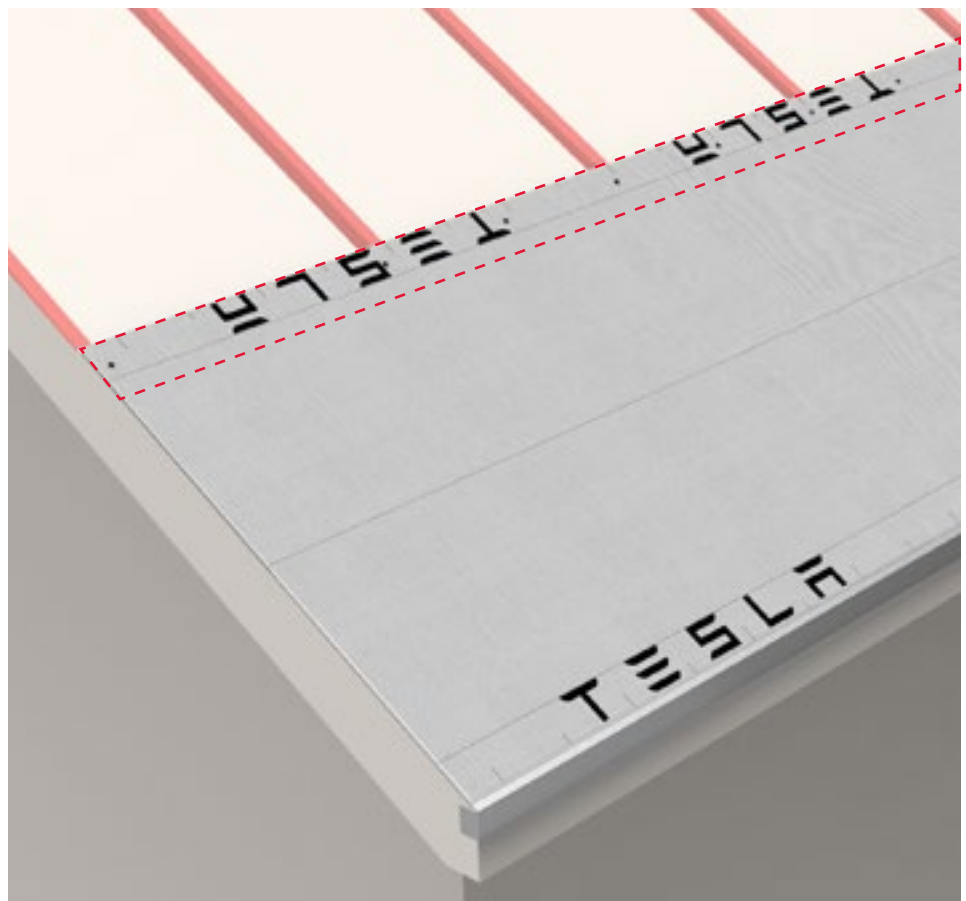
The next underlayment course will overlap the horizontal laps 3". This will cover the nails and the upside-down Tesla logo. Ensure the second course is staggered a min 24" from the bottom end lap. Then continue the same nailing pattern for the next sections and underlayment courses. Use a roller along the entire face of the underlayment to ensure an adequate seal.



When Installing underlayment at rake area in extreme conditions fasten the horizontal lap using nails every 12" on the bottom of the markers. At the eave drip edge, the underlayment will be fastened during the Starter Trim installation. On exposed overhangs, nail only on rafters unless the soffit is enclosed.



Closeup of Nailing with Overhangs



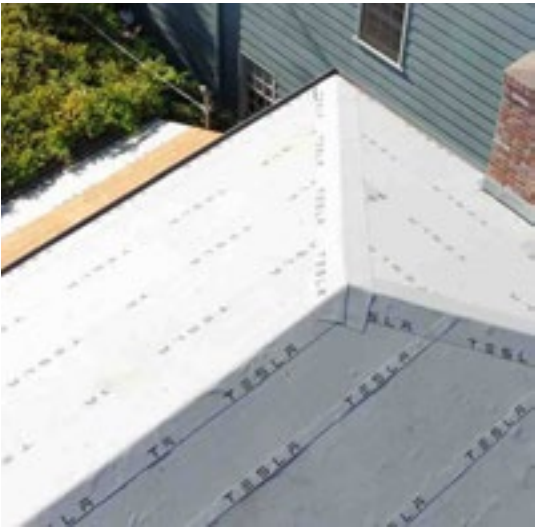
TESLA UNDERLAYMENT | TECHNICAL DATA SHEET

PRODUCT SUMMARY

Tesla Underlayment is a self-adhering peel and stick roofing underlayment designed for sloped roof applications to help protect against water infiltration from wind-driven rain, snow, and ice damming.

CODE COMPLIANCE REPORTS AND STANDARDS:

Intertek CCRR-0386 Underlayment	TAS100
Intertek CCRR-0351 Solar Roof System	ASTM D1970
ICC AC48/ICC AC188	ASTM E108 Class-A (SR-SAUL-1) and Class-C (SR-SAUL-2)
Solar Roof System Florida Product #FL31342	



PRODUCT CHARACTERISTICS

Color	Gray with Black Line Marks and Tesla Logo
Thickness	51 mils (1.3mm)
Membrane Weight	0.32 lbs/sqft
Roll Weight (w/Release Film)	71 lbs (32 kg)
Roll Coverage (Gross)	38"W x 67' L = 212.16 sqft/roll
Roll Coverage (Net)	35"W x 67' L = 195.41 sqft/roll
Surface	Textured Non-Woven Polypropylene
Maximum Full Exposure	6 Months
Minimum Install Temperature	14°F (-10°C)
Maximum Install Temperature	105°F (74°C)
Primer	Not Required
In-Service Temperature Range	-40°F to 240°F (-40°C to 115°C)
Warranty	25 Years
Release Liner	Double-Sided Silicon Treated Split Polyethylene
Adhesive Technology	Synthetic (Asphalt Free)
EPDM and TPO Compatibility	Yes

TESLA UNDERLAYMENT | TECHNICAL DATA SHEET

ASTM D1970 SPECIFICATION REPORT

TEST PERFORMED	REQUIREMENT	TESLA UNDERLAYMENT RESULTS
Underlayment Unrolling	No Cracking or Sticking @ 40°F (4.4°C) and 140°F (60°C)	Pass
Thickness	Min 1.0 mm (40 mils)	51 mils (1.3mm)
Tensile Strength MD	Min 25 lbf/in-width	148 lbf/in-width
Adhesive Elongation MD	Min 10%	106%
Tensile Strength CD	Min 25 lb/in-width	143 lbf/in-width
Adhesive Elongation CD	Min 10%	84%
Adhesion to Plywood at 4.4°C (40°F)	Min 2.0 lbf/ft-width	101 lbf/ft-width
Adhesion to Plywood at 23.9°C (75 F)	Min 12.0 lbf/ft-width	79.6 lbf/ft-width
Thermal Stability Max Displacement	Max 3mm (0.1 in)	0mm
Flexibility at -29°C (-20°F)	No Cracking and No Leak (head of water)	Pass
Tear Strength MD	Min 20 lbf	759 lbf
Tear Strength CD	Min 20 lbf	686 lbf
Moisture Vapor Permanence, Max	Max 0.1 U.S. Perm	0.07 perm Class I - Vapor Retarder
Nail Sealability	No Leaking	Pass
Waterproof Integrity of Lap Seam	No Leaking	Pass

TESLA UNDERLAYMENT | TECHNICAL DATA SHEET

ICC AC188 SUMMARY REPORT

TEST PERFORMED	REQUIREMENT	TESLA UNDERLAYMENT RESULTS
Pliability ASTM D146 Section 14	Shall see no cracking when bent 90° degrees at a uniform speed over a rounded corner of 1/2- inch radius.	Pass
Accelerated Aging AC48 Section 4.7	Shall see no visible damage to the specimens such as cracking, chipping or defacement shall occur.	Pass
UV Exposure AC48 Section 4.8	Shall see no visible surface or structural changes such as peeling, chipping, cracking, flaking or pitting shall occur when observed under a minimum of five power magnification.	Pass
Tensile Strength AC48 Section 4.1, 4.7, 4.8 & ASTM D1970	Control, accelerated-age, and ultraviolet samples shall have a minimum breaking strength of 25 lbf/in width for both machine and cross-directions.	Pass
Adhesion AC48, Section 4.5, 4.7 & 4.8	Conditioned specimens shall exceed 75% of the value determined for the control specimens, for each substrate (plywood and OSB).	Pass
Liquid Water Transmission ASTM D4869 Section 8.3.5	Shall meet the "Pass" requirements of Section 8.6 of ASTM D4869-2015 or Section 8.3.5 of ASTM D4869-2005 (2011) e01, ASTM D4869-2004. No sign of water wetness.	Pass
Cycling and Elongation AC48, Section 4.6	No cracking of the material or bond failure between the product and the plywood substrate.	Pass
Unrollability AC188 Section 3.2	Shall not crack or become so sticky as to cause tearing or other damage, upon being unrolled at temperatures between 50° F and 140°F (10°C and 60°C)	Pass

REFERENCES & EVALUATION REPORTS

[Code Compliance Research Report CCRR-0386](#)

[Code Compliance Research Report CCRR-0351](#)

Revision History

Date	Rev	Changes	Author
12/13/21	5	• updated intro • updated section on first course • updated hip section • updated valley section • updated square obstruction section • updated round obstruction section • updated ridge and patch section • updated title on extreme conditions	bwest
12/09/21	4	• Temp and text change to intro • Removal of steep pitch conditions	bwest
12/01/21	3	• add new part number for class-c underlayment	bwest
10/21/21	2	• Replaced all mention of nails or screws to appropriate fastener. • Updated all images and content for skylights • Change up-lap to a min of 3" from 4"	Bwest