



FLAT LOCK TILES

System Technology for Roofing

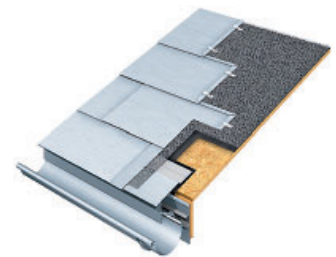
DESIGN AND APPLICATION



Harriet Tubman Visitor's Center, Cambridge, MD

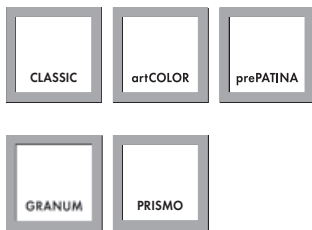


Szabó Ervin Bibliothek, Budapest, Hungary



Flat Lock Tile Roof System

1. This system may be fabricated from the following PRODUCT LINES:

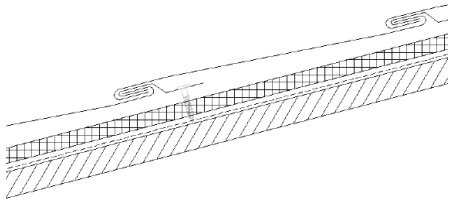


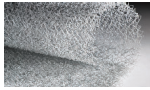
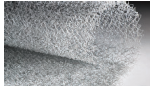

2. Diamond, Rectangular and Square shapes.
3. Easy to fabricate and install.
4. Perfect solution for curved surfaces.
5. Appropriate for roofs with 3 in 12 pitch or greater.
6. Widths up to 2'-0"; lengths up to 10'-0".
7. For optimum flatness, maintain overall panel dims at less than 24" x 48".
 - 0.7 mm thick RHEINZINK is recommended for tiles less than 2 square feet.
 - 0.8 mm thick RHEINZINK is recommended for tiles from 2 square feet or larger.
 - 1.0 mm thick RHEINZINK is recommended for optimum flatness on larger tiles.
 - 0.7 mm thick RHEINZINK for panel widths 12" -16".
8. For cost effectiveness and ease of fabrication and installation limit panel lengths to 10'-0". Consult a RHEINZINK representative for applications requiring longer lengths.

9. Drained and back ventilated rainscreen system with interlocking hooked seams. No sealants or gaskets required.
10. Refer to the RHEINZINK baseline details for corner, parapet, and penetration options. Consult a RHEINZINK representative for customized applications.
11. Panels can be roll formed or fabricated using brake forming or folding machines.
12. Consult a RHEINZINK representative for advise on whether your project requires a ventilated mat and factory applied backside coating.
13. All roof installations require Air-Z or Enkamat (7008 or 7010).

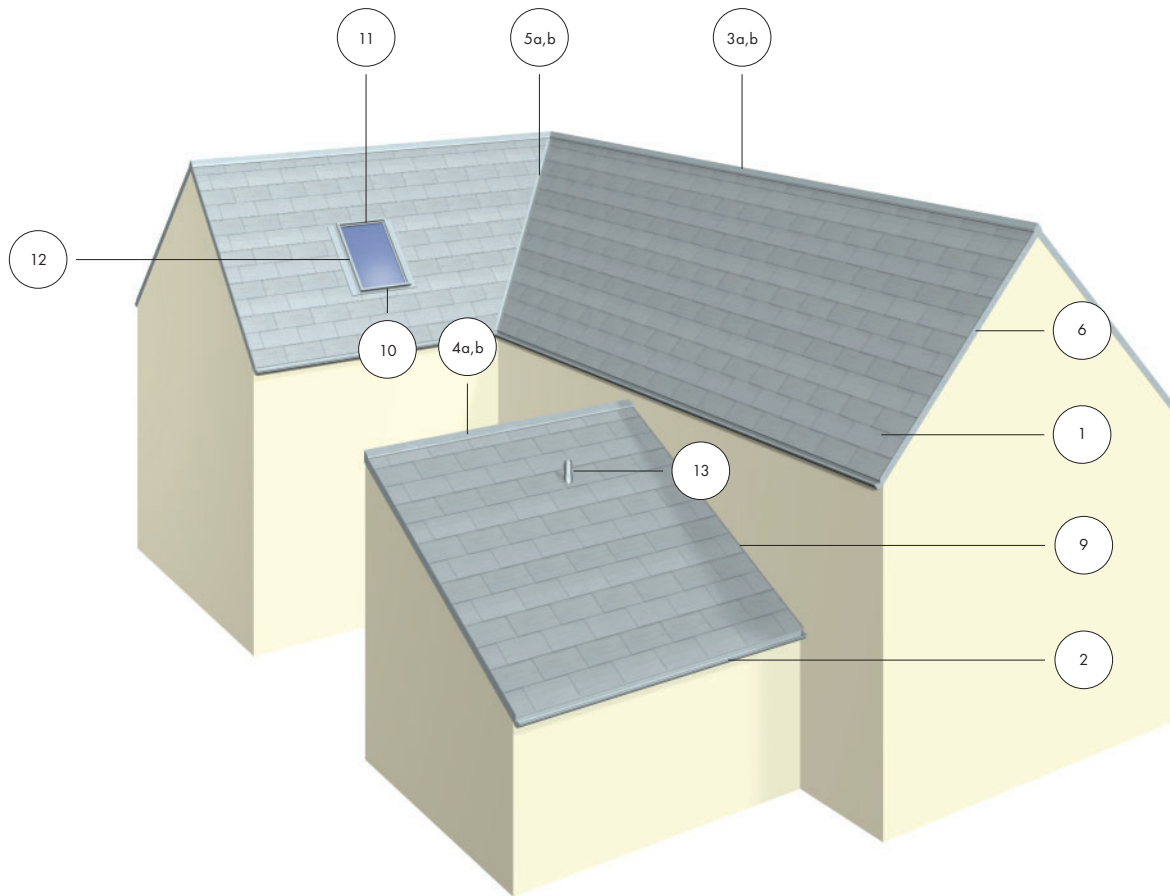
Photo on prior page: Nanjing Niu Shou Montain, Nanjing City, Jiangsu, China

FLAT LOCK TILE ROOFING



Roofing Application:		
Flat Lock Tile: > 6 in 12	Air-Z or Enkamat (7008 or 7010)	
Flat Lock Tile: > 3 in 12 to 6 in 12	Air-Z or Enkamat (7008 or 7010) AND ProRoofing	 + 

- A roof with a minimum pitch of 3 in 12 and greater.
- On flat lock tile roofs, breathable membranes are appropriate. High temperature peel and stick self adhesive membranes are recommended as the underlayment at the eaves, rakes, hips, ridges, valleys and around penetrations such as chimneys, soil pipes, skylights, etc. to maintain water tightness.
- Flat lock tile roofs should have cross seams consisting of a water check and an additional soldered cleat 6" from the water check for the engagement of the roof panels at the hips, ridges, valleys and around penetrations such as chimneys, soil pipes, skylights, or other lengths of valley.
- Flat lock tile roofs with pitches minimum of 3 in 12 require the added protection of backside coating (ProRoofing) and drainage mat - RHEINZINK Air-Z or Enkamat (7008 or 7010) by Colbond.
- Attachment clips and their associated fasteners for mid slope standing seam roofs should be made of stainless steel.
- Roof penetrations such as skylights, chimneys, or vents that interrupt the seams constitute the most vulnerable part of any flat lock tile roof. These areas must be detailed carefully with apron flashings with sufficient overlap lengths, capillary breaks, and water checks. Consult a RHEINZINK representative for advice on proper details for these conditions.
- Prevent water from getting under the metal by either turning up the panel ends at ridges and roof / wall intersections or by some other means of a closure.
- Terminate eave ends of panels by leaving the underside of the eave hook horizontal to facilitate drainage of leakage or condensation.
- All roof installations require Air-Z or Enkamat (7008 or 7010).



Interlocking Tile Details

FLRP-1 - Eave Detail

FLRP-2 - Built-In Gutter Detail

FLRP-3a - Ridge / Hip Detail - Opt. 1

FLRP-3b - Ridge / Hip Detail - Opt. 2

FLRP-4a - Mono-Pitch Ridge Detail - Opt. 1

FLRP-4b - Mono-Pitch Ridge Detail - Opt. 2

FLRP-5a - Valley Detail - Opt. 1

FLRP-5b - Valley Detail - Opt. 2

FLRP-6 - Rake Edge Detail

FLRP-7 - Cross Joint Detail

FLRP-8 - Roof to Wall Transition Detail

FLRP-9 - Sidewall Detail

FLRP-10 - Skylight Sill Detail

FLRP-11 - Skylight Head Detail

FLRP-12 - Skylight Jamb Detail

FLRP-13 - Vent Pipe Penetration Detail

FLRP-14 - Diamond Fab. Detail

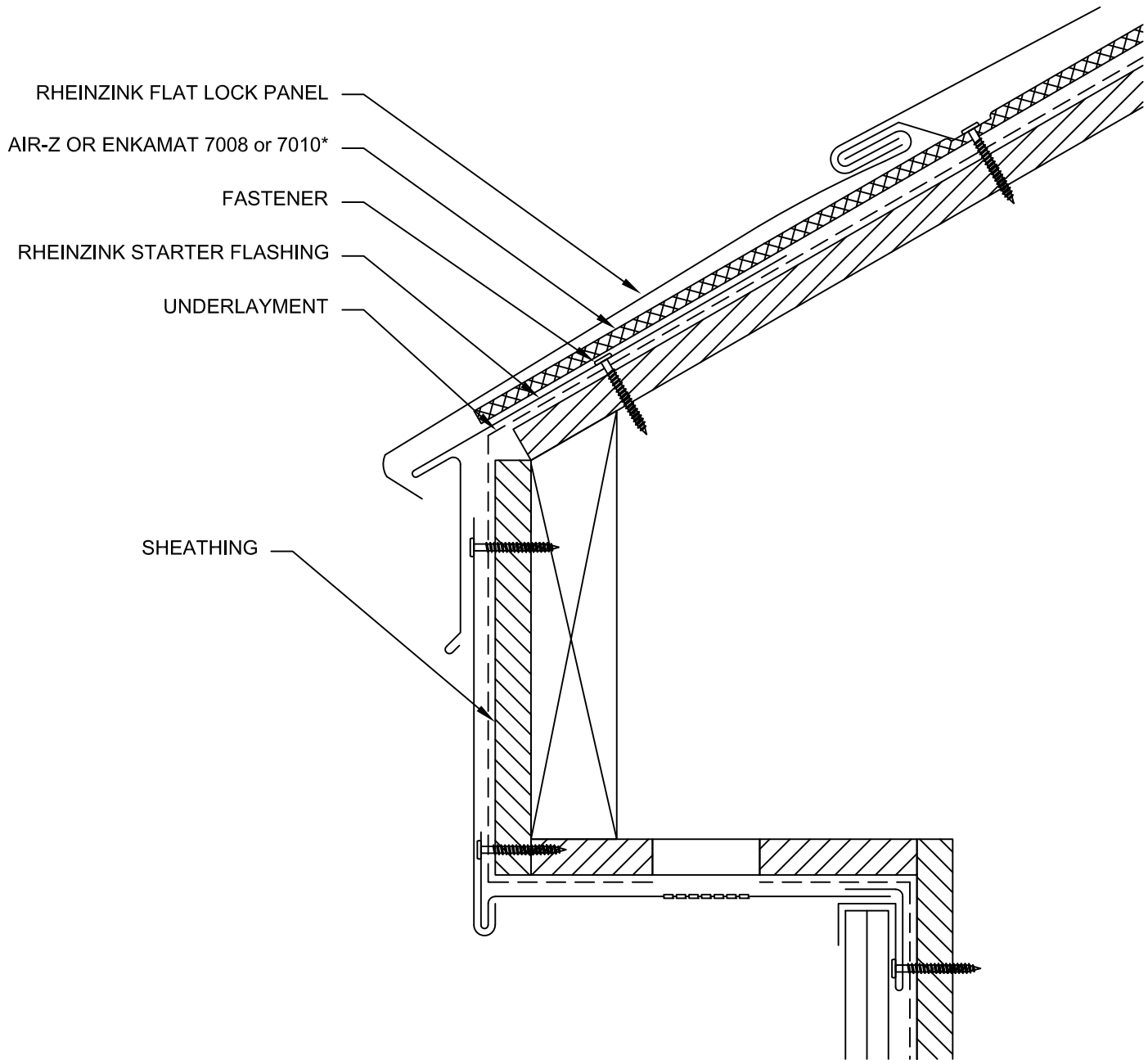
FLRP-15a - Rect. Fab. Detail - Horizontal

FLRP-15b - Rect. Fab. Detail - Vertical

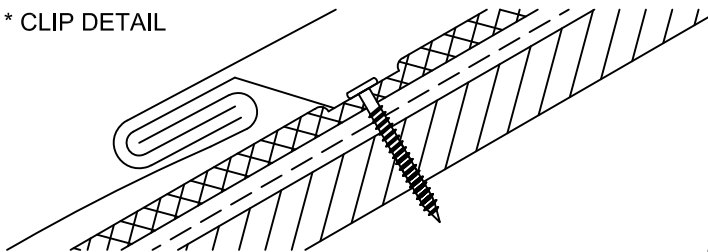
FLRP-15c - Rect. Fab. Detail - H Folded

FLRP-15d - Rect. Fab. Detail - V Folded

FLRP-16 - Square Fab. Detail




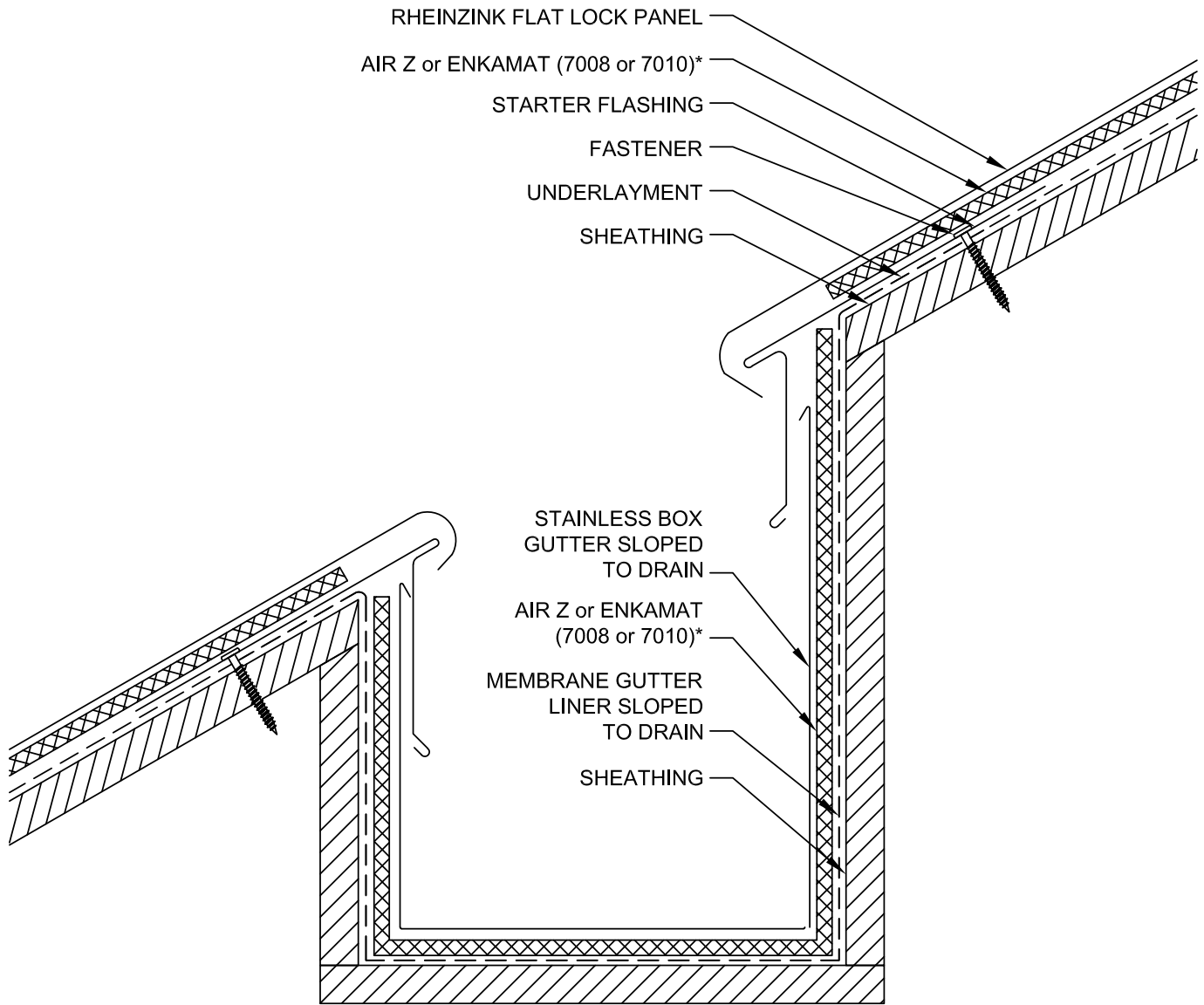
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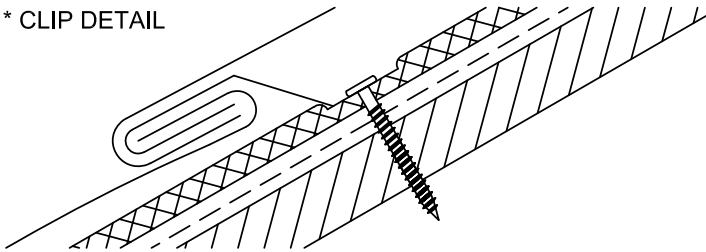
NOTES:

1. RHEINZINK RECOMMENDS STAINLESS STEEL FASTENERS AND CLIPS.
2. FLAT LOCK PANELS REQUIRE A MINIMUM OF 3:12 PITCH. FLAT LOCK PANEL ROOF SYSTEMS UP TO 6 IN 12 REQUIRE BOTH PROROOING AND AIR-Z OR ENKAMAT (7008/7010) FLAT LOCK PANELS OVER A 6 IN 12 PITCH REQUIRE AIR-Z OR ENKAMAT (7008/7010) OR PROROOING.

		
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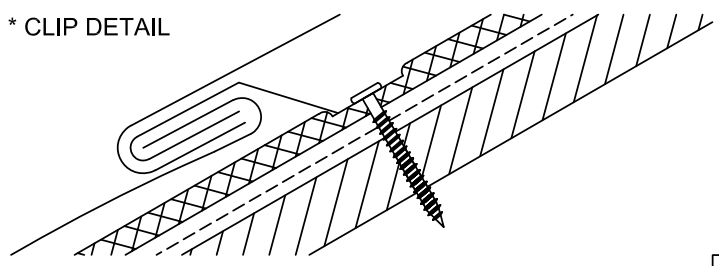
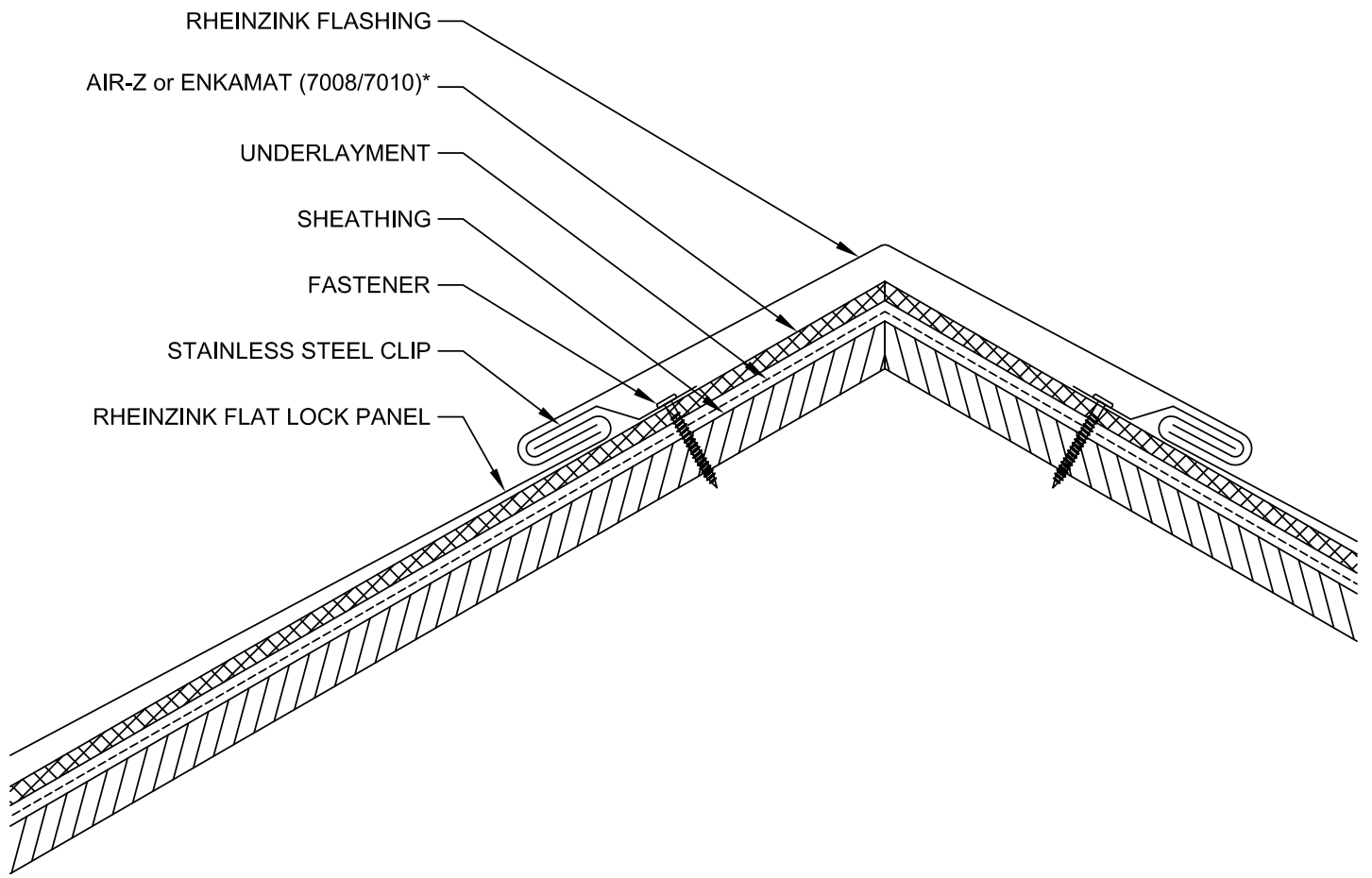
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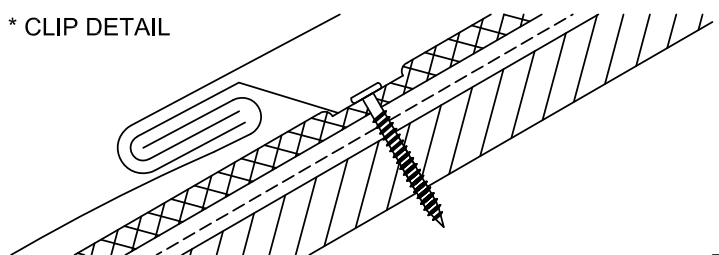
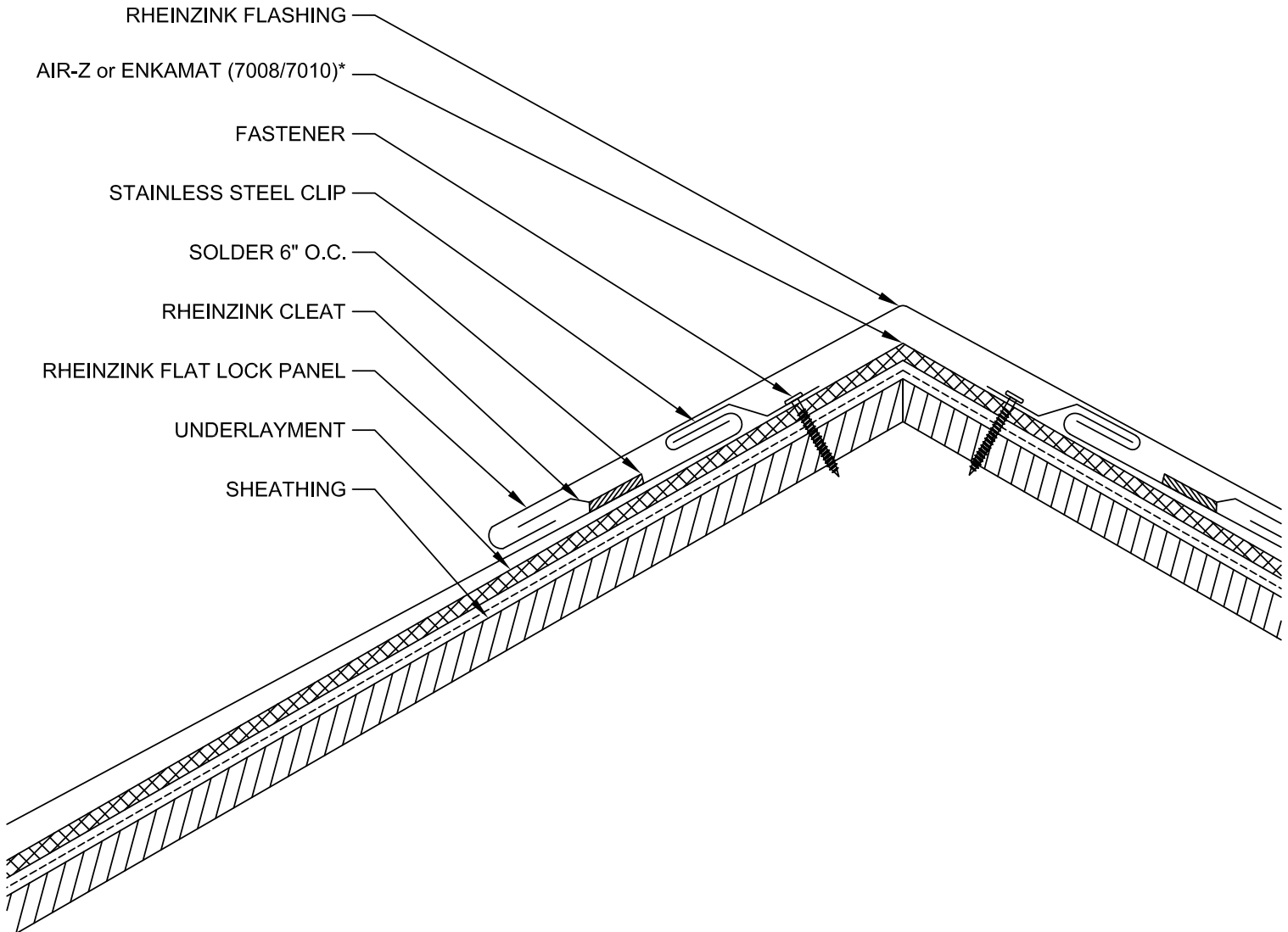
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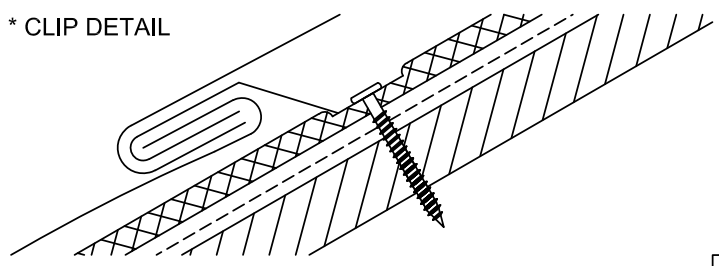
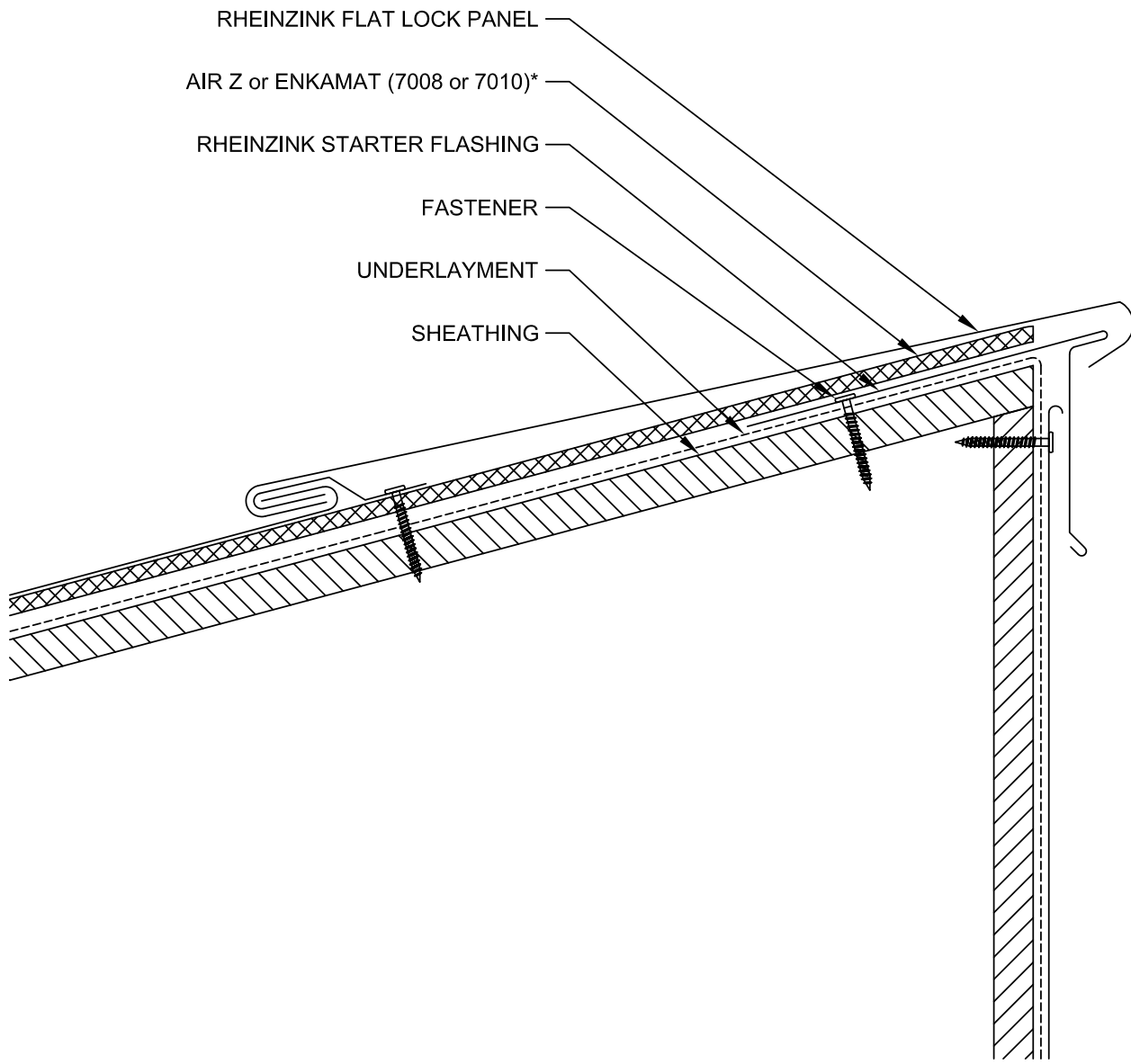
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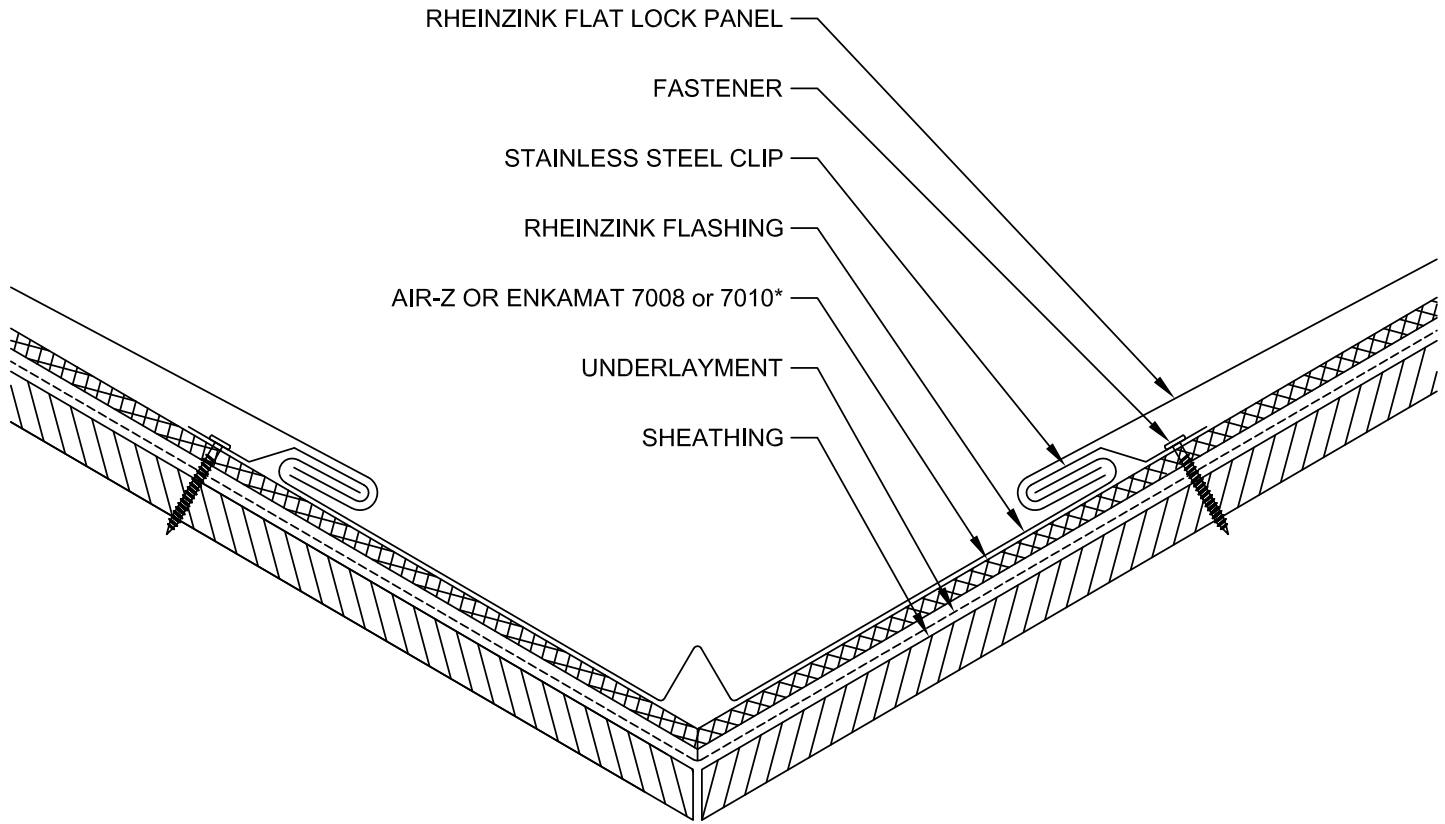
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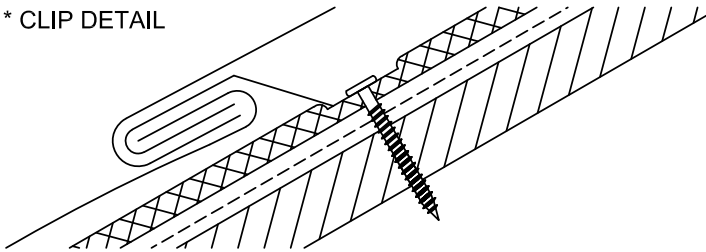
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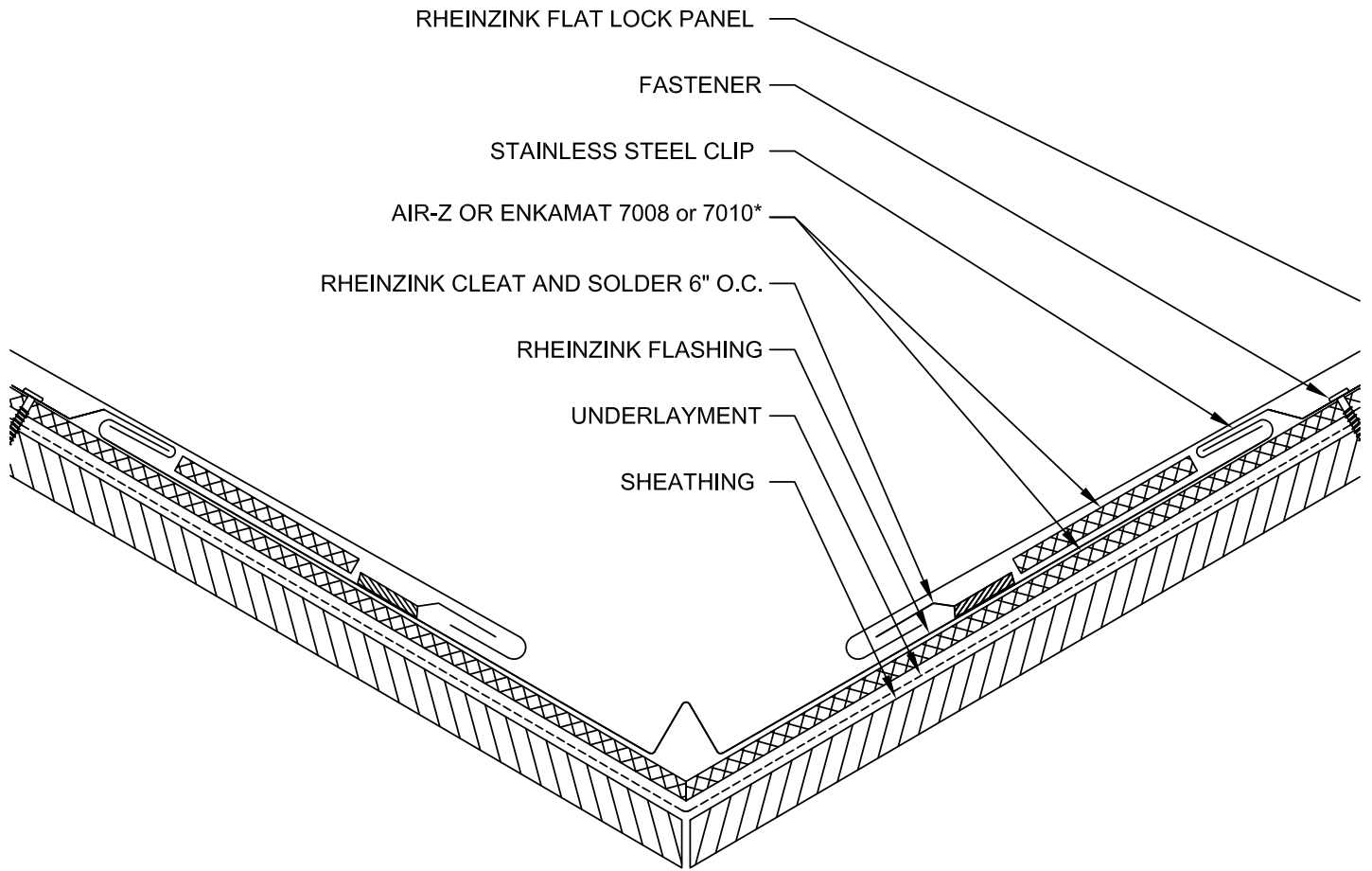
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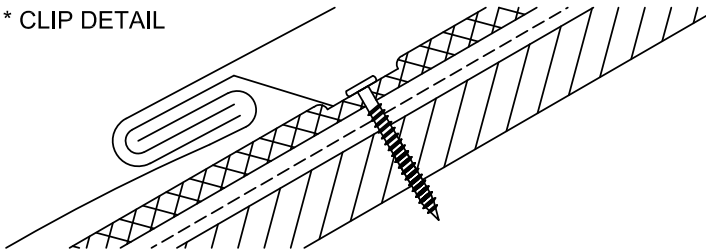
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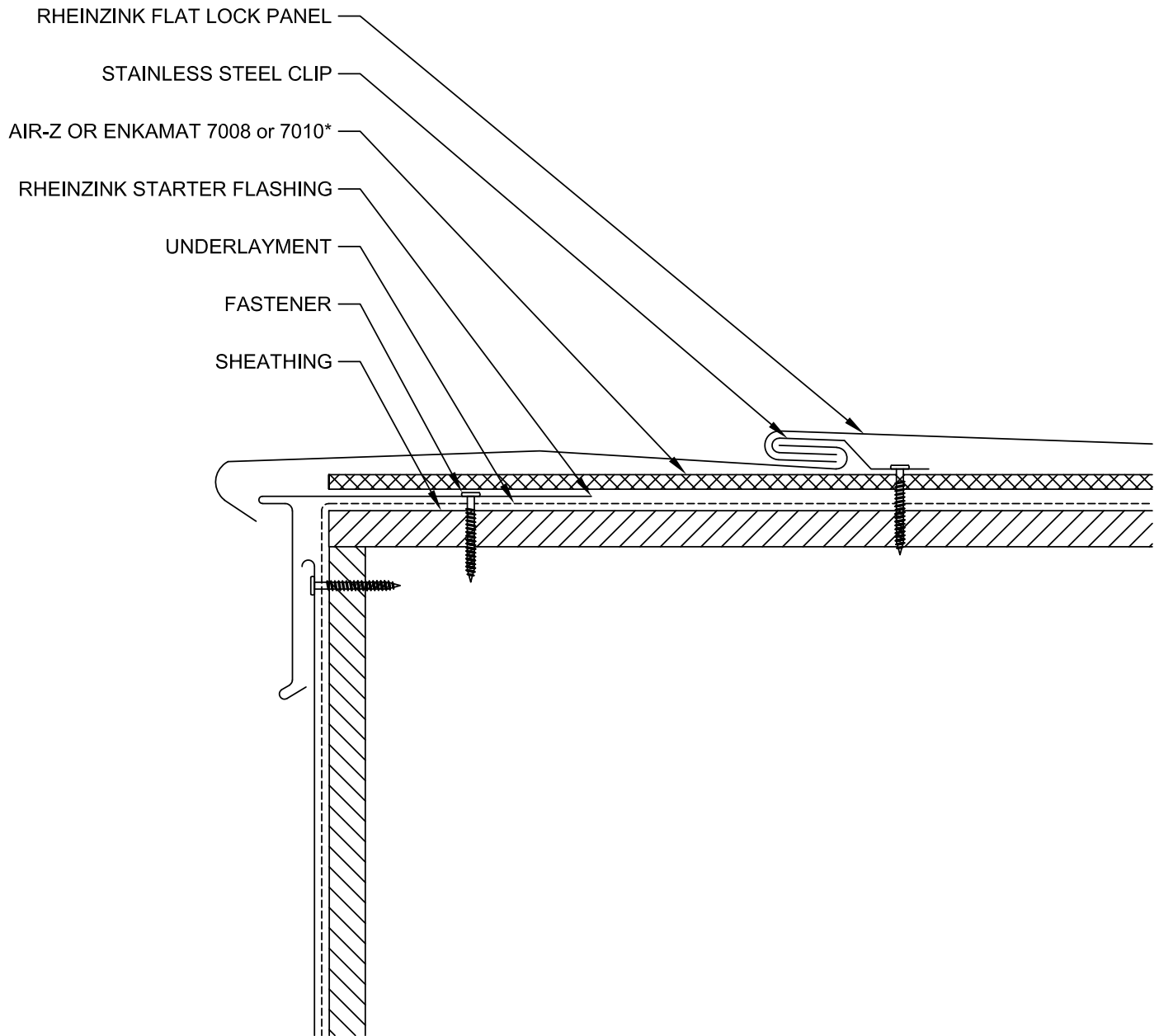
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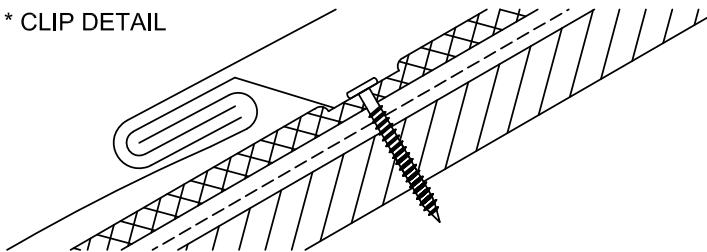
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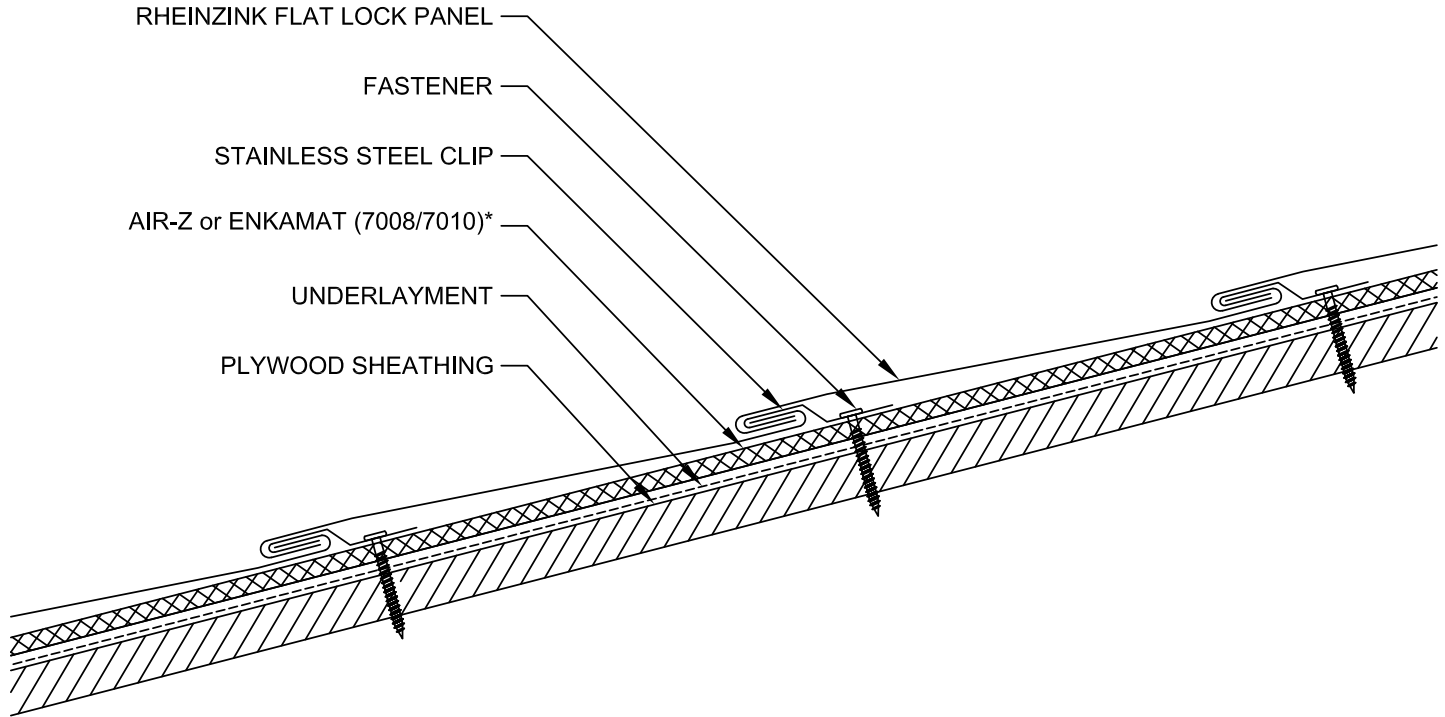
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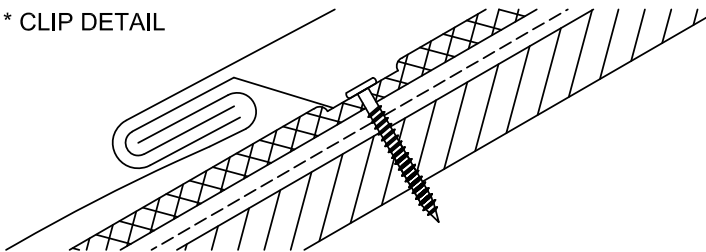
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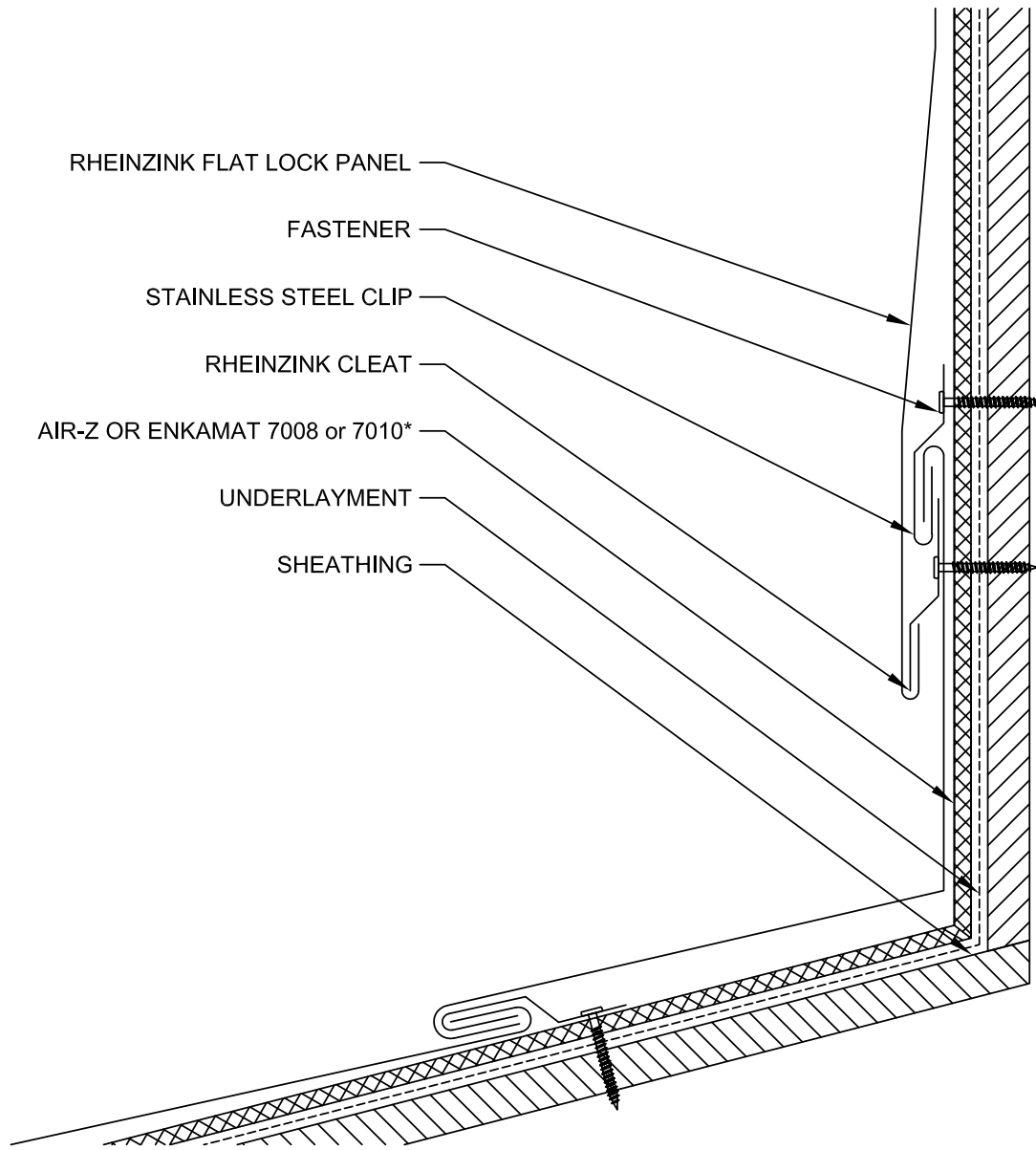
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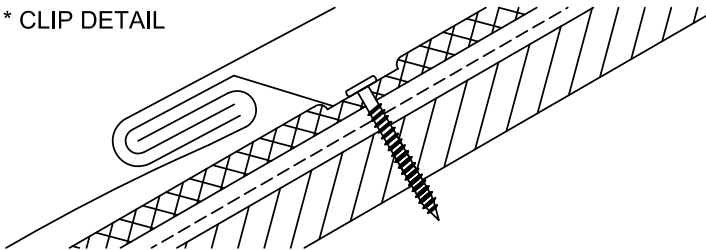
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RHEINZINK FLAT LOCK PANEL
 FASTENER
 STAINLESS STEEL CLIP
 RHEINZINK CLEAT
 AIR-Z OR ENKAMAT 7008 or 7010*
 UNDERLAYMENT
 SHEATHING

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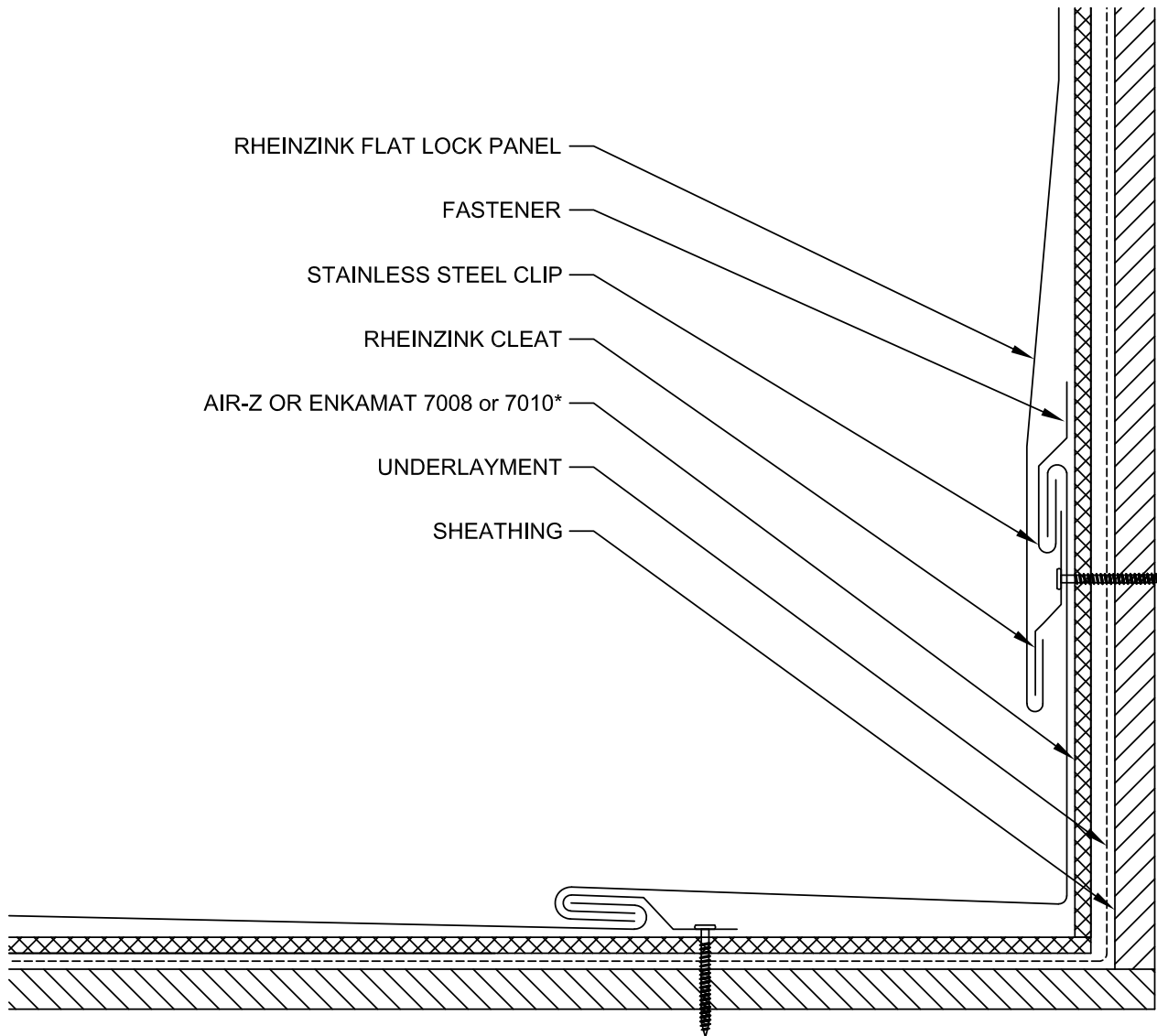
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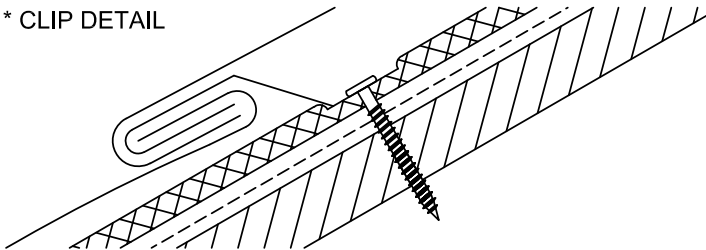
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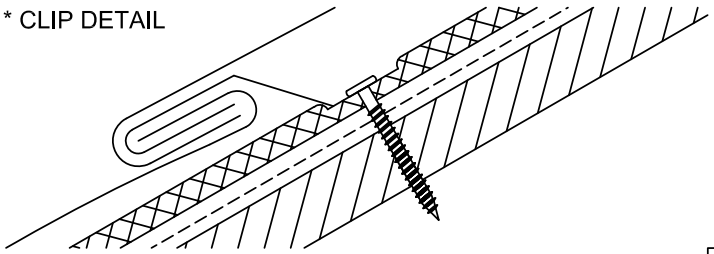
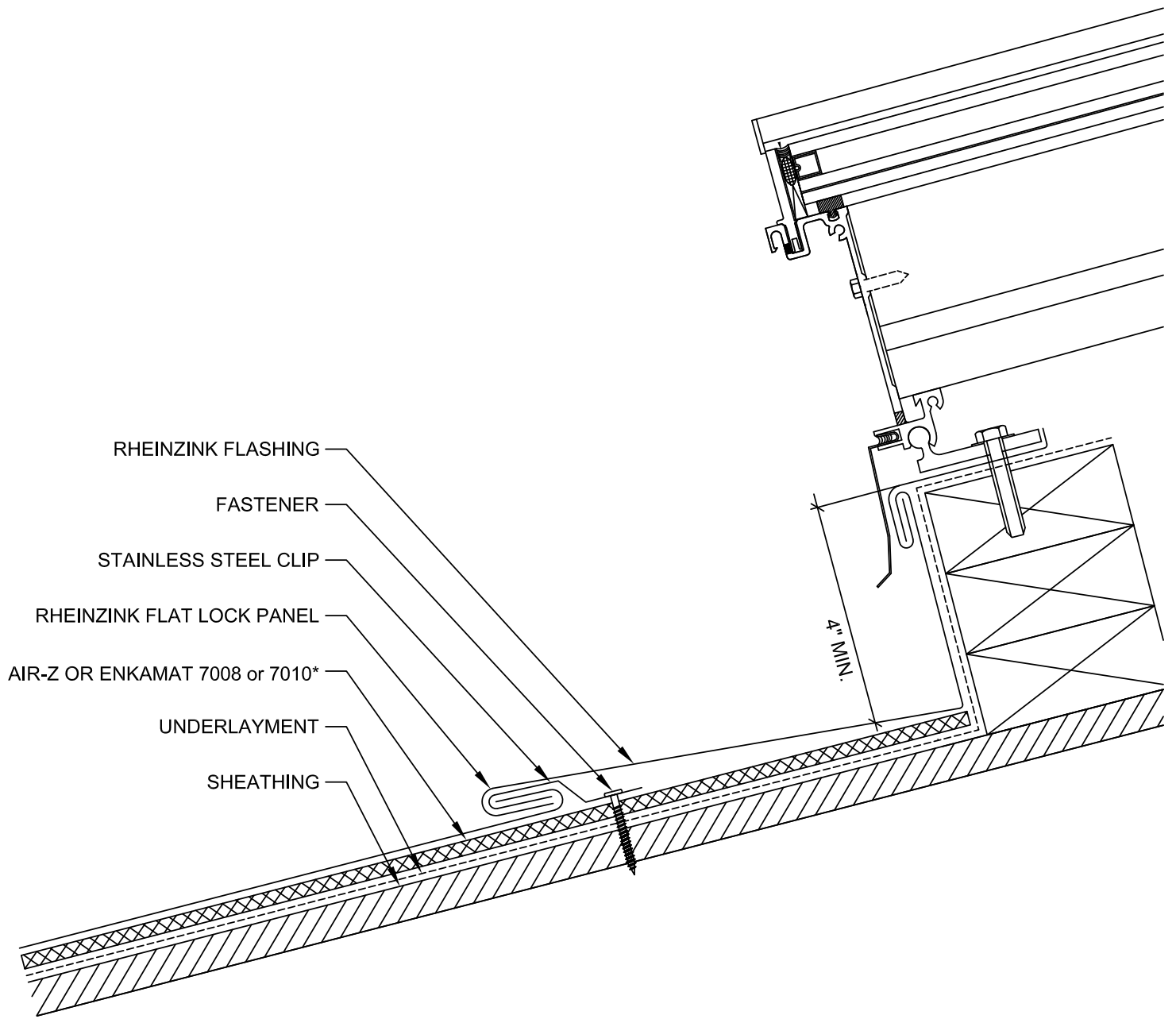
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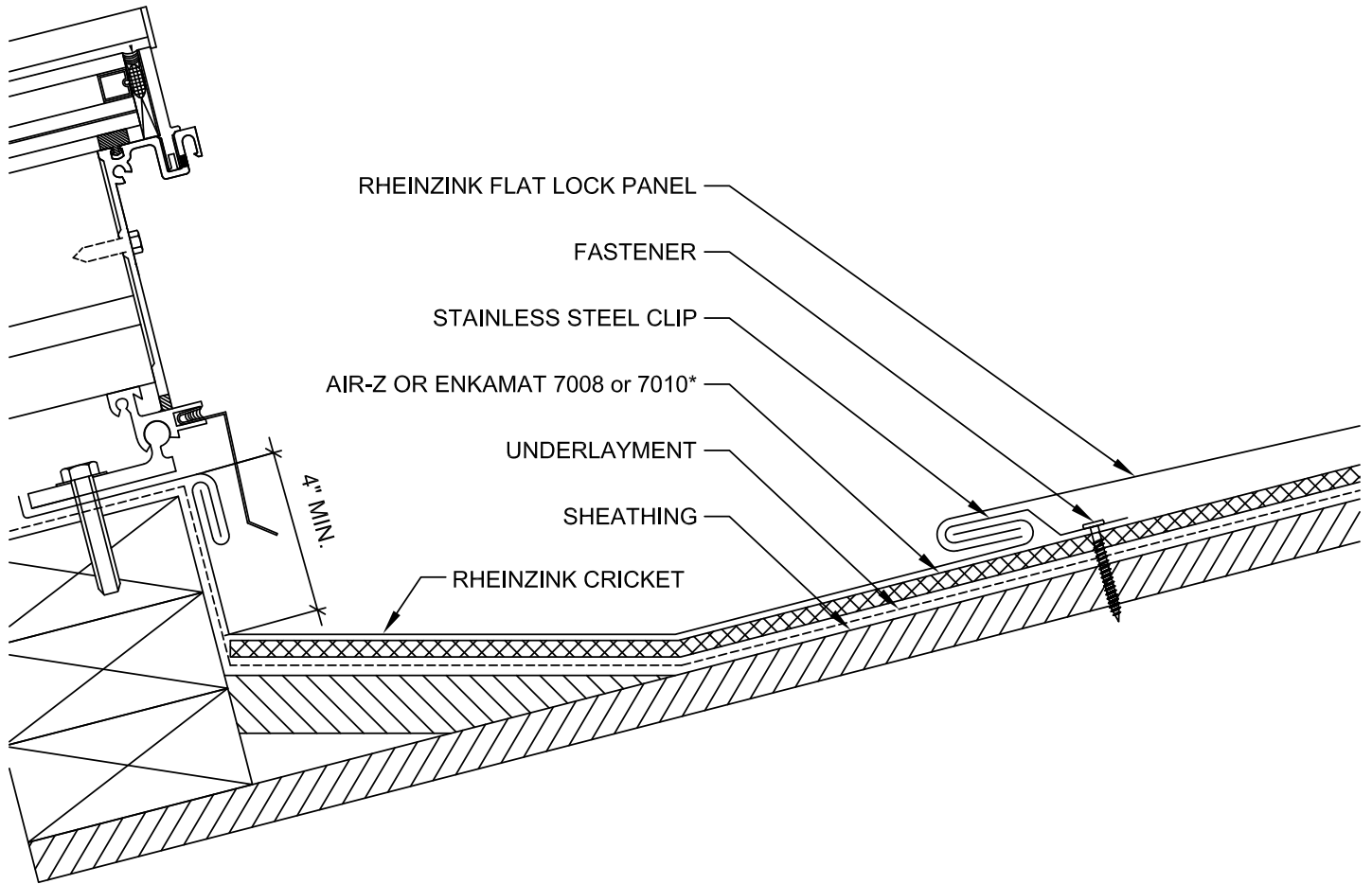
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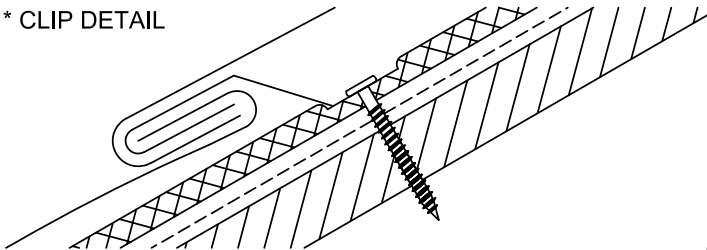
NOTES:

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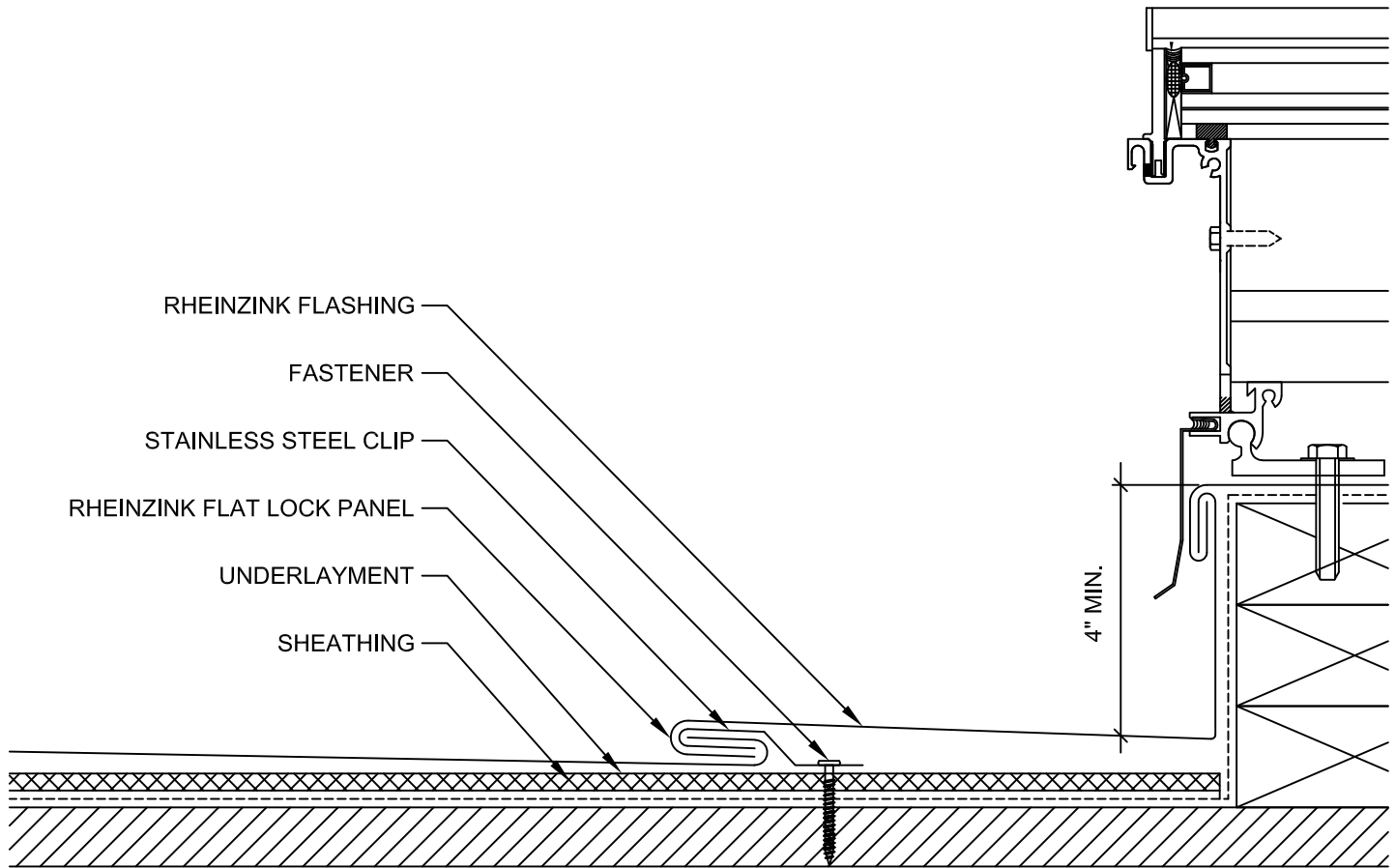
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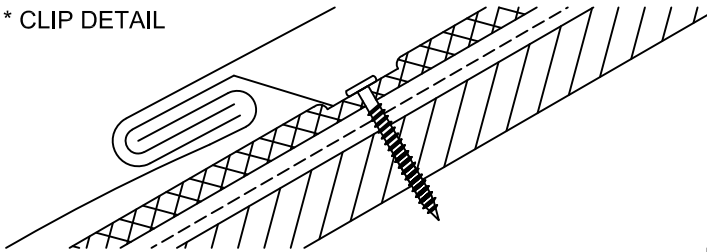
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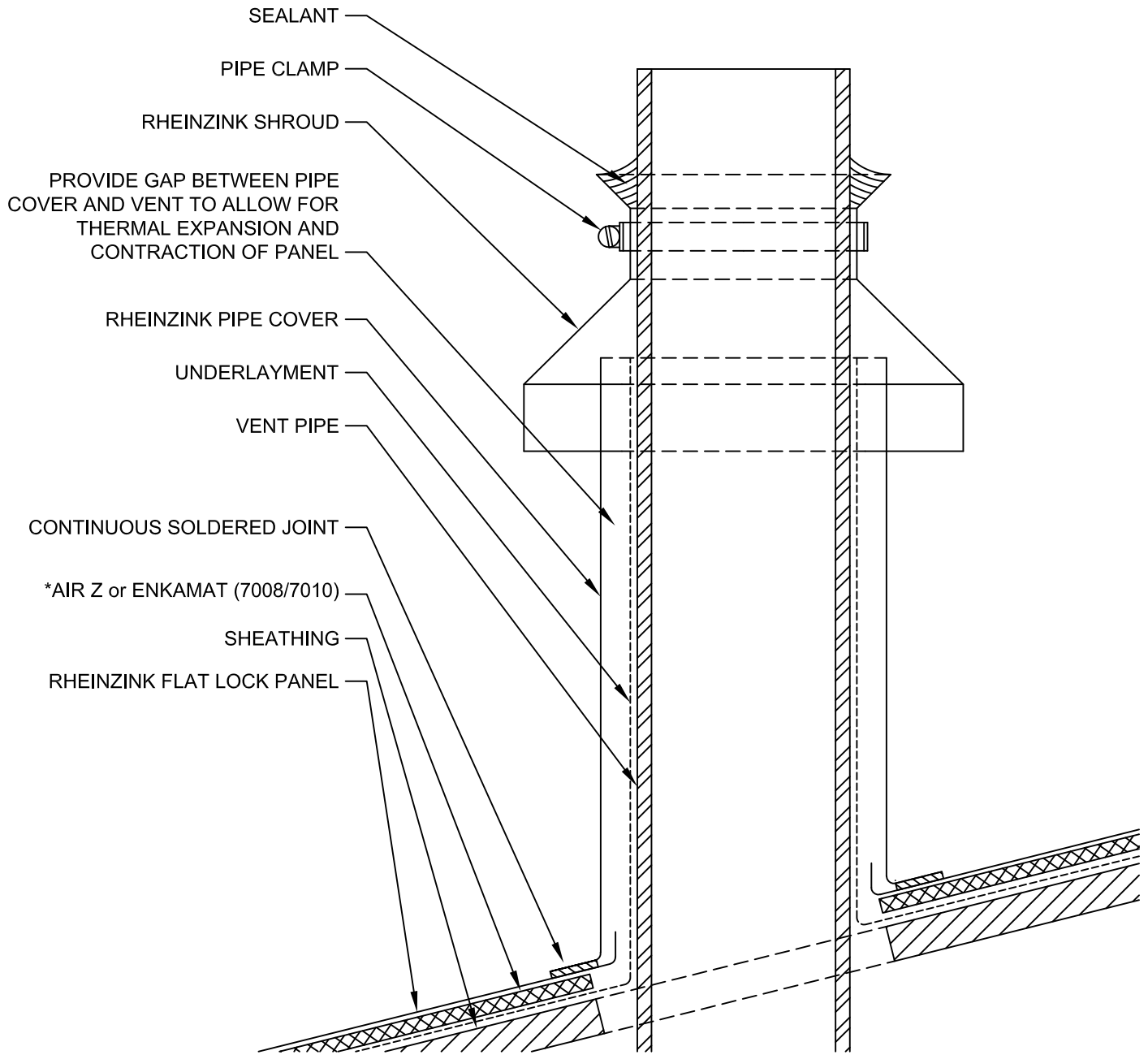
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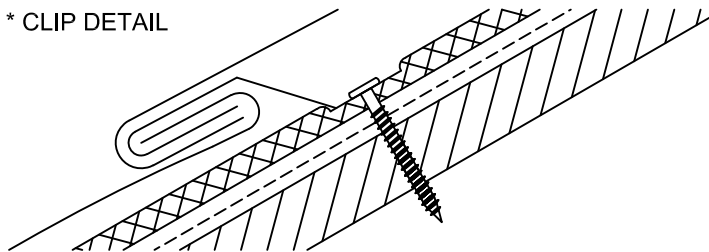
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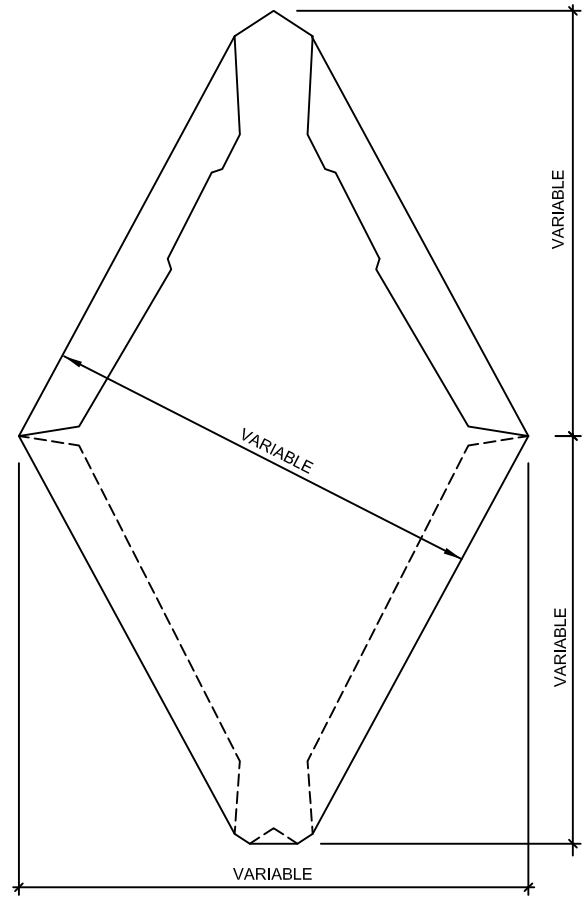
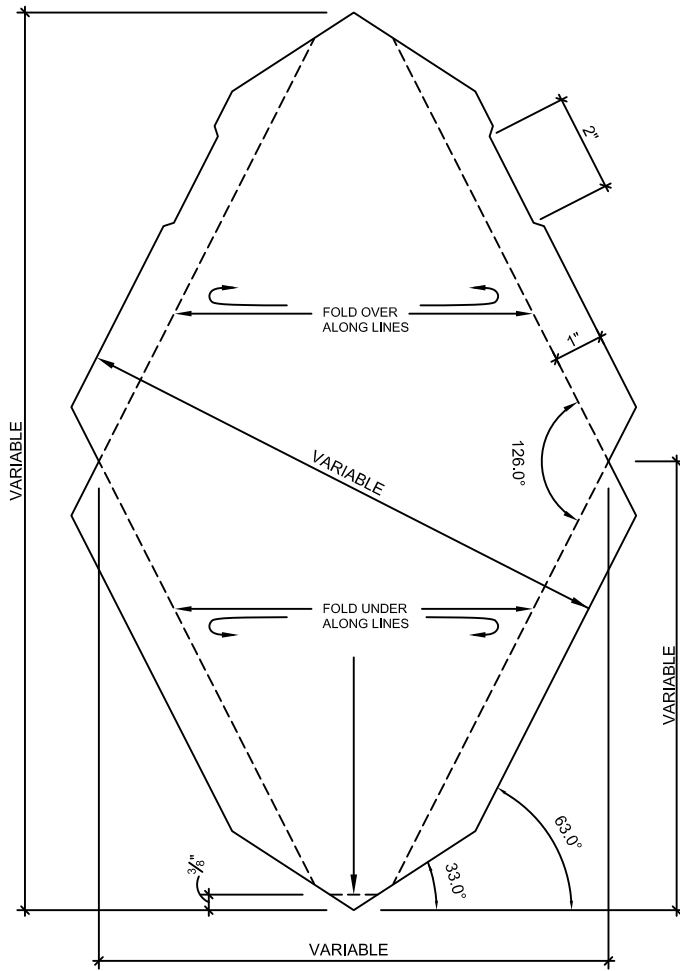
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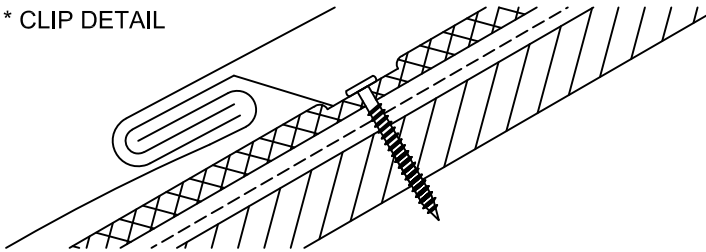
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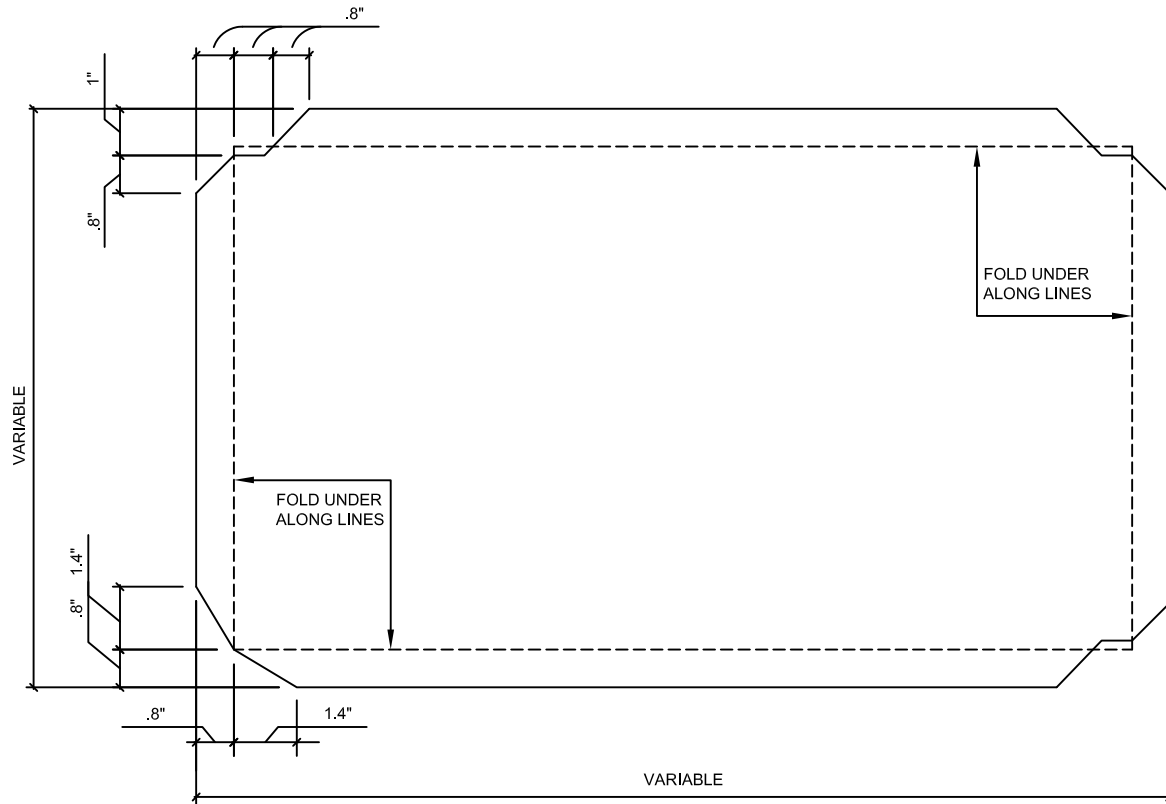
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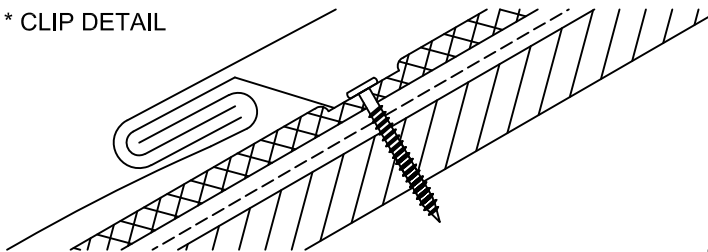
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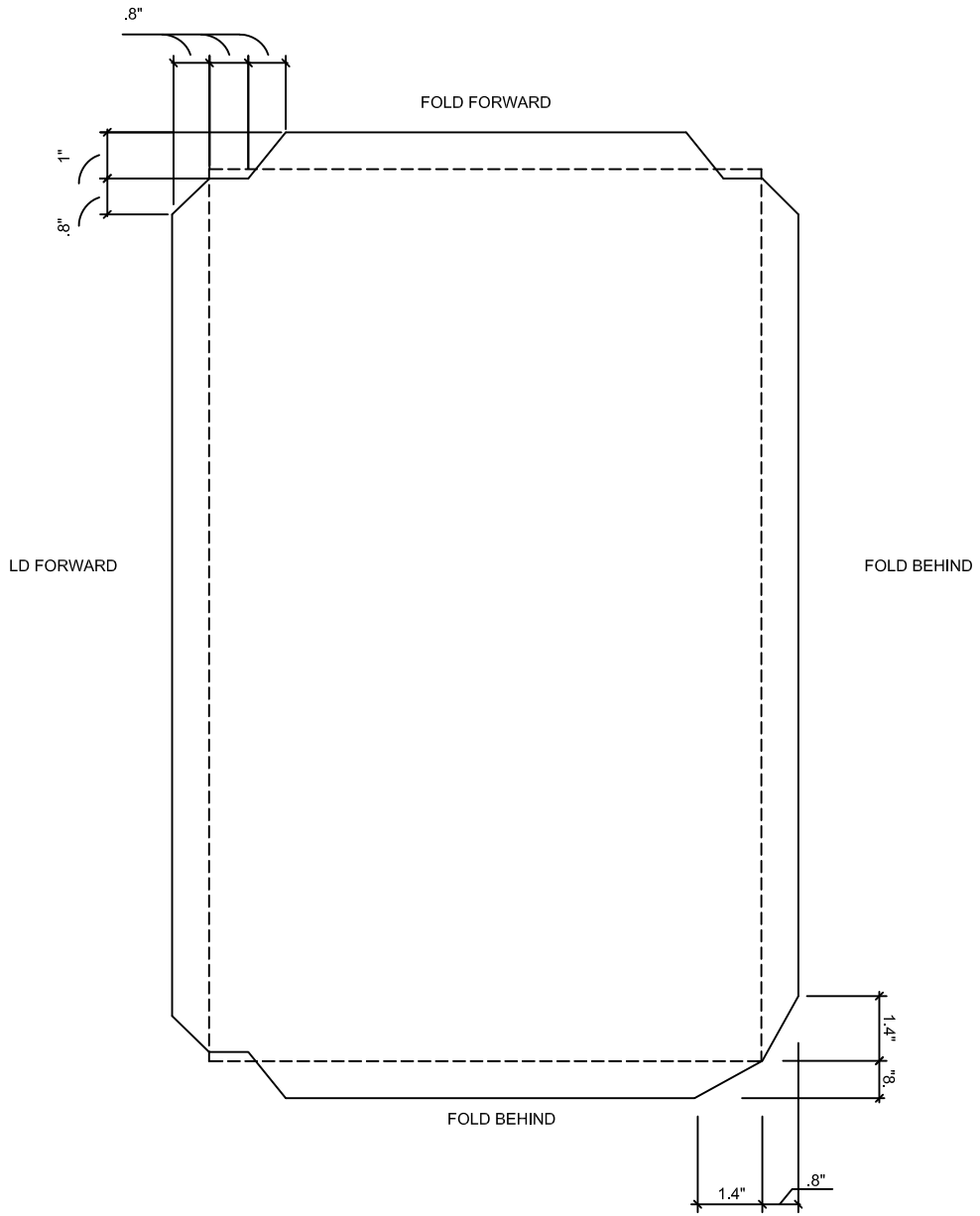
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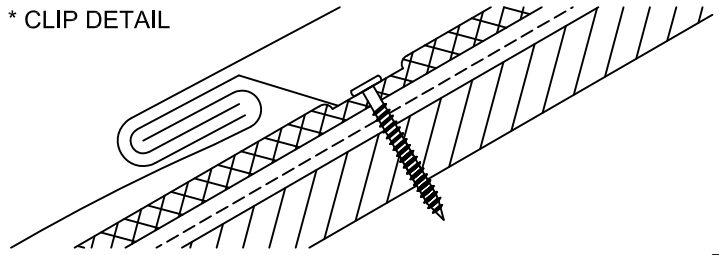
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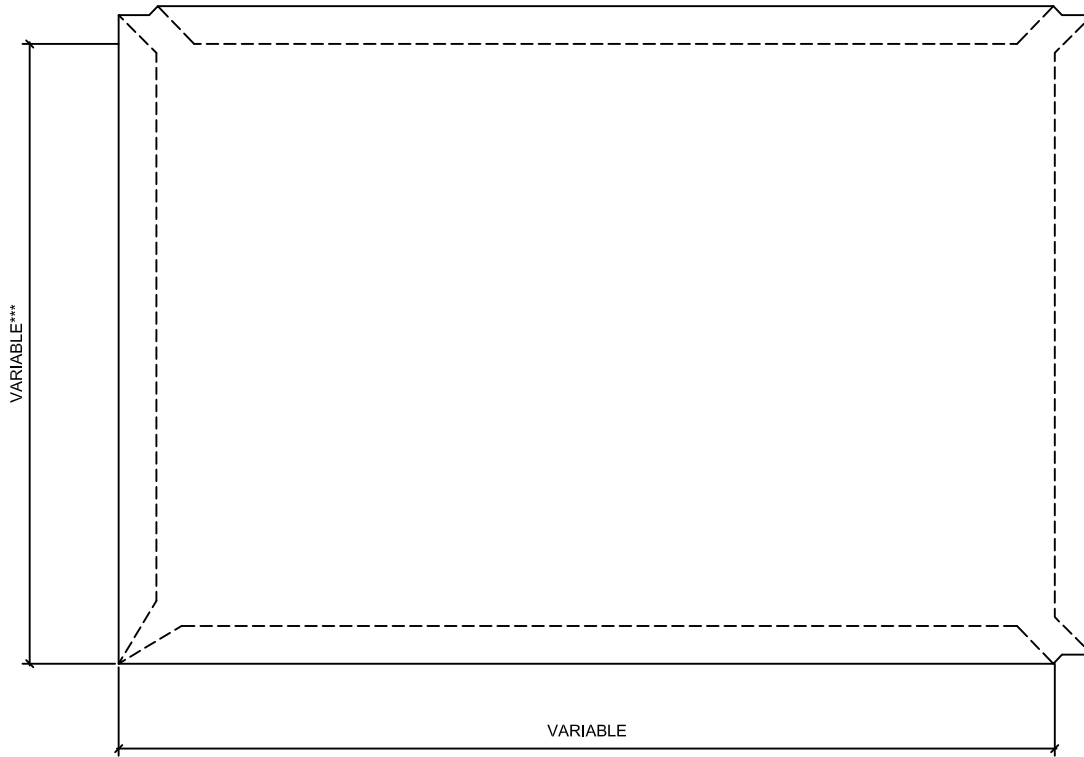
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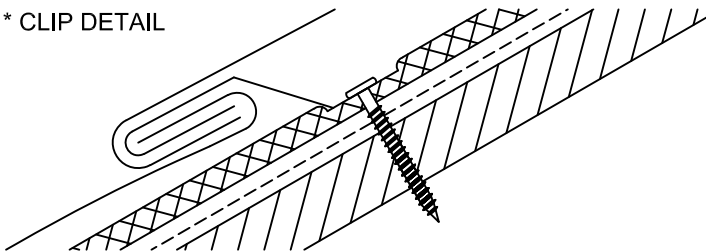
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3. CLIP QUANTITY AND SPACING TO BE DETERMINED BY ENGINEERING CALCULATIONS

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SECTION 07 61 00 – FLAT LOCK TILE ZINC ROOFING

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

- A. All of the Contract Documents, including General and Supplementary Conditions and Division 1 Specification Sections, apply to the work of this Section.
- B. Examine all Drawings and all other Sections of the Specifications for requirements therein affecting the work of this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.02 DESCRIPTION OF WORK

- A. The Work of this Section shall include, but not be limited to, the following:
 - 1. Custom fabricated, mechanically attached, [RHEINZINK-CLASSIC bright rolled, RHEINZINK-prePATINA blue-grey, RHEINZINK-prePATINA graphite-grey, RHEINZINK-GRANUM skygrey, RHEINZINK-GRANUM basalte, RHEINZINK-artCOLOR various colors and PRISMO various colors] zinc alloy [reveal and shiplap panels] [vertical or horizontal] as indicated on the Drawings, with all required accessories for a weatherproof installation.
 - 2. [Zinc gutters and downspouts] as indicated on the Drawings.
 - 3. Zinc coping and wall trim as indicated on the Drawings
 - 4. Penetrations [doors, windows, louvers, etc...] in the wall assembly as indicated on the Drawings.
- B. Related Sections:
 - 1. Section 05400 – Cold Formed Metal Framing
 - 2. Section 06100 – Rough Carpentry
 - 3. Section 07210 – Building Insulation
 - 4. Section 07265 – Air and Vapor Barrier Membrane
 - 5. Section 07410 – Metal Wall Panel Systems
 - 6. Section 07500 – Membrane Roofing
 - 7. Section 07620 – Sheet Metal Flashing and Trim
 - 8. Section 07720 – Roof Accessories
 - 9. Section 07920 – Joint Sealants

1.03 REFERENCES

- 1. ASTM B69-16 (or latest edition) – Architectural Rolled Zinc - Types 1 and 2 – Standard Specification for rolled zinc.
- 2. RHEINZINK Division 7 Binder: latest edition.
- 3. RHEINZINK Material and Processing Guidelines: latest edition
- 4. SMACNA – Architectural Sheet Metal Manual; latest edition; Chapter 7 as a minimum standard or these specification and details where they exceed.
- 5. Names of the applicable building codes or other authorities having jurisdiction:

6. As all documents are intended to be complementary, in the event of contradiction in the references, the RHEINZINK Division 7 Binder; latest edition will govern.

1.04 SUBMITTALS

- A. Product Data: provide zinc manufacturer's product data for zinc sheet material including any fabricator's product specifications, standard details, and installation instructions. Indicate installer's intent for roof tile fabrication by shop fabrication or pre-manufactured zinc tiles.
- B. Installer References: Installer shall submit list of (3) completed "natural metal" roof installations (zinc or copper) of similar scope and complexity.
- C. Material Samples: submit [RHEINZINK-CLASSIC bright rolled, RHEINZINK-PREPATINA blue-grey, RHEINZINK-PREPATINA graphite-grey, RHEINZINK-GRANUM skygrey, RHEINZINK-GRANUM basalte, and RHEINZINK-artCOLOR - various colors and PRISMO – various colors] (Note artCOLOR and PRISMO are premium colors) color samples of each material that is to be exposed in the finished work. As required by architect, also provide two fabricated panel samples to demonstrate connection.
- D. Shop Drawings: show layouts of tiles on all roof plans, location of all roof penetrations, details of tile terminations, edge conditions, joints, corners, tile profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory and field assembly work. Provide actual dimensions to the greatest extent possible.
 1. Details for forming sheet metal components, including dimensions.
 2. Details for joining and securing sheet metal components, including vertical and horizontal seam patterns, clip spacing, fastener requirements, and other attachments.
 3. Details of termination points and assemblies, including fixed points.
 4. Details of expansion joints, including direction of expansion and contraction (where applicable).
 5. Details of roof penetrations.
 6. Details of edge conditions, including eaves, ridges, valleys, rakes, crickets and counter flashings.
 7. Details of special conditions, integrating mechanical, electrical and plumbing conditions.
 8. Details of connections to adjoining work
 9. Details of the following accessory items, at a scale of not less than 1 ½ inches per 12 inches:
 - a. Flashing and Trim
 - b. Gutters including outlet locations and expansion joints
 - c. Downspouts
 - d. Roof Access Steps
 - e. Safety Line Attachments
- E. [Engineering Calculations: As required by Architect, Installer to provide wind load (positive and negative pressure) calculations based on substrate [exterior sheathing, galvanized steel sub-framing] information provided by the Contractor. Calculations to utilize fastener pullout data and known panel physical properties to provide "estimated" design performance. Submit written certification showing calculations prepared and stamped by a Professional Structural Engineer licensed and registered in the project state.]

1.05 QUALITY ASSURANCE

- A. Fabricator/Installer Qualifications: The fabricator and installer of the wall panel system shall be trained by the zinc material manufacturer [and system fabricator]. Installer shall submit list of three (3) successful "natural metal" project installations of similar complexity and scope.
- B. Source: Provide panels, which are the product of one manufacturer. Provide secondary materials, which are acceptable to the zinc manufacturer. Award installation of zinc roof panels, including weather-barrier underlayment to a single firm for undivided responsibility.
- C. Comply with RHEINZINK Division 7 Binder; latest edition and SMACNA-Architectural Sheet Metal Manual; latest edition for flashings and sheet metal work.
- D. Field Measurements: Prior to fabrication of roof tile and flashing, take field measurements of structure or substrates to ensure proper fit and alignment.
- E. Pre-Installation Conference: Two weeks prior to commencement of work, convene an installation conference to include the Architect, General Contractor and Zinc roof Installer in order to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work.
 - 1. Review methods and procedures for installation including, but not limited to: substrates, sub framing, drains, curbs, and penetrations.
 - 2. Review drawings, specifications and roof submittals
 - 3. Review construction schedule verifying availability of all materials, personnel and equipment needed to proceed and avoid delays
 - 4. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including cold temperatures and temporary roofing.
- F. Mock-Up: As determined by the Architect, Contractor to provide roof carpentry for mock-up ready for zinc roof tile installation. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at roof area location directed by Architect. Retain accepted mock-up as quality standard for acceptance of completed metal roofing. As appropriate, mock-up may be incorporated as part of final metal roofing work.
 - 1. Provide mock-up of sufficient size and scope to show typical pattern of joints, panel width, panel length, edge construction, a sample of soldering (where required) and finish texture and color.
 - 2. Provide mock-up of gutter and eave assembly
 - 3. Extent of mock-ups is indicated on the Drawings
 - 4. Obtain Architect's written approval of mock-ups prior to proceeding.
- G. Soldering: In accordance with manufacturer's instructions.
- H. Corrosion Control: Contractor to avoid direct contact of incompatible materials including but not limited to copper, red rosin paper and masonry cleaning solutions.

1.06 PERFORMANCE REQUIREMENTS

- A. Design roof assembly to conform to the requirements of the _____ Building Code.
- B. Install sheet metal roofing tiles and underlayment system capable of withstanding exposure to weather without failure or infiltration of water into the building interior.

- C. Wind Load: Design and engineer sheet metal roof assemblies, including size and spacing of attachment devices, meeting requirements of local building codes.
- D. Thermal Movement: Provide systems and connections, which allow for thermal movement resulting from ambient temperature range of -4 °F to 176 °F.
- E. Structural Performance: Provide metal panels, anchors and attachments, which resist loads, required by code and loads as indicated on the Drawings without permanent deflection or deformation. Information on Drawings referring to specific design of attachment, panel stiffening, and structural systems is intended for information only. System performance, based on project conditions and compliance with all applicable codes and loading requirements, shall be the responsibility of the panel fabricator and installer.

1.07 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials and products in unopened factory labeled packages. Protect from all possible damage. All zinc sheet, coil, and shop fabricated tiles to be crated and transported according to zinc manufacturer's and fabricator's recommendations.
- B. Store and handle in strict compliance with zinc manufacturer's instructions and recommendations.
 - 1. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Slope cover to shed moisture. Allow for free airflow around covered material to exchange outside air.
 - 2. Require all personnel to wear clean white cotton gloves when handling and installing zinc tiles and accessories when no strippable film is present.
 - 3. Do not store panels in contact with other materials that might cause staining, denting, or other surface damage.
 - 4. Store all zinc tiles and flashings so that they will not accumulate water.
- C. Exercise care in unloading, storing, and erecting tiles to prevent bending, warping, or surface damage.
- D. Sequence deliveries to avoid delays, but minimize on-site storage.
- E. Contractor to deny other trades onto finished roof without permission of zinc installer. Installer to limit unnecessary walking on finished roof. Require all personnel to wear uncontaminated, clean, rubber-soled shoes when installing or walking on roof.

1.08 WARRANTY

- A. Material Only Warranty: provide X-year limited warranty for Titanium-Zinc alloy from original rolling mill manufacturer. Warranty to cover the material quality of the sheet/ coil material used to fabricate sheet metal flashing & trim profiles appropriate for zinc installation.
- B. Fabrication Warranty: provide X-year fabrication warranty against sharp bends that fracture the metal, tears, and equipment induced damage to the Architectural Zinc sheet or coil.
- C. Installation Warranty: provide X-year guarantee covering the proper material or product application preventing failure due to hot-water corrosion, damage due to inappropriate slip sheet, absorptive separation material, or other installer induced failure.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Available Zinc Manufacturer: Subject to compliance with requirements, Manufacturers offering metal roof or wall panel materials that may be incorporated in the work include:
1. RHEINZINK America, Inc.
Woburn, MA 01801 ph: (781) 729.0812
Regional Sales Manager _____ ph: _____
www.rheinzink.us, info@rheinzink.com
- B. Zinc Alloy Sheet/Coils:
1. Titanium Zinc Alloy whose base is electrolytic high grade with a 99.995 % Zn degree of purity and alloying additives of 0.08% - 1.0% copper and 0.07% - .12% titanium, .001% - .015% aluminum in accordance with ASTM B69-16 (or latest edition) – Architectural Rolled Zinc - Type 1 and Type 2.
 - a. RHEINZINK-CLASSIC bright rolled
 - b. RHEINZINK-prePATINA: pickling process
 1. blue-grey
 2. graphite-grey
 - c. RHEINZINK-GRANUM: phosphating process
 1. sky-grey
 2. basalte
 - d. RHEINZINK-artCOLOR: PVDF finish
 1. various colors
 2. ProRoofing backside coating
 - e. RHEINZINK-PRISMO - PVDF finish
 1. various colors
 2. ProRoofing backside coating
- C. Flat Lock Tiles require a minimum of 3:12 pitch. Flat lock tile roof systems up to 6 in 12 require both ProRoofing and Air-Z or Enkamat (7008 or 7010). Flat lock tiles over a 6 in 12 require Air-Z or Enkamat (7008 or 7010).
2. Minimum Panel Thickness: [0.7mm (24 ga.), 0.8 mm (22 ga.), 1.0 mm (20 ga.)]
 3. Minimum Flashing Thickness: 0.7 mm (24 ga.)
- D. Panel Fabricator or System Manufacturer:
1. Local / Regional Sheet Metal Fabrication Shop:
 - a. Select roof tile fabricator that has the equipment and personnel capable of providing quality zinc roof panels as indicated on the drawings.
 - b. Installer's option to purchase prefabricated wall panels as provided by an approved and experienced RHEINZINK system partner or fabricator.

2.02 PROFILES

- A. Fabricated Roof Tile:
 - 1. Shape: Diamond, Square, or Rectangular Tile
- B. Size: As indicated on drawings
- C. Seams: Flat-lock design (two hems turned out, two hems turned under)
(Minimum $\frac{3}{4}$ ' length of hems)
- D. Tile Layout: As indicated on drawings

2.03 ACCESSORIES

- A. Provide all components necessary for a complete, functional, weatherproof assembly including, but not limited to, trim, copings, fascias, sills, flashing, counter flashing, door frame trim, corner units, clips, wall caps, copings, sealants, closures and fillers. Metal materials shall match panels and be zinc compatible.
- B. Clips & Fasteners: Provide stainless steel concealed clips and stainless steel fasteners; supplied in accordance with manufacturer's recommendations and to meet the load requirements as specified by architect and confirmed by engineering calculations. Attachment clips shall permit expansion and contraction of the panel system throughout the specified temperature range. When permeable air barrier sheets are used and as required by the architect to resist liquid water penetration at the fastener penetration, provide fasteners with watertight washer gaskets (such as self-adhered membrane).
- C. Roof Ventilation Mat (capillary break): As indicated on drawings (but not required on façade applications), provide manufacturer's approved nylon non-woven ventilation mat equal to Air-Z by RHEINZINK or Enkamat (7010 or 7008), by Bonar, Enka, NC.
- D. Self-adhered Waterproof Underlayment: non-permeable self-adhering, high-temperature composite, butyl rubber-based, polyethylene-backed membrane such as GRACE Ultra™ or other high-temperature rubberized-asphalt sheet.
- E. Permeable Underlayment: Permeable breather type underlayment membrane: SLOPESHEILD PLUS as manufactured by VaproShield (note taped joints & fastener gasket requirement).
- F. Synthetic Underlayment: Low-perm film used as a substitute for felt. Manufactured in large sheets to minimize seams. Provide RoofTopGuard II, TriFlex 30 or equal.
- G. Solder: Lead solder containing 50% tin and 50% lead in accordance with ASTM B32 – 08 (or latest edition) or lead-free solder. Flux: Felder ZD-Pro or equal.
- H. Sealants:
 - 1. Seam Sealing Tape: pressure-sensitive 100 per cent solids polyisobutylene compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic non-staining tape.
 - 2. Joint Sealant: DOW 795; or other documented pH neutral sealant
 - 3. Backer rod shall be extruded polyethylene foam as DOW ETHAFOAM SB or equal.

2.04 TILE & FLASHING FABRICATION

- A. General: Custom fabricate sheet metal panels to comply with details shown and recommendations in SMACNA's "Architectural Sheet Metal Manual" and RHEINZINK Division 7 Binder; Latest Edition that apply to the design, dimensions (pan width and depth), geometry, metal thickness, and other characteristics of installation indicated. Shop fabricates sheet metal wall panels and accessories at the shop to the greatest extent possible.
 - 1. Flat Lock Roofing Tiles: Form flat lock roofing tiles from coil or sheet stock with the grain running in the same direction. Two hems are to be folded out with the remaining two hems folded under. Hems should be a minimum of 3/4" in length
 - 2. Provide backside coated zinc or other permanent separation materials on concealed metal surfaces where tiles would otherwise be in direct contact with substrate materials that are non-compatible or could result in corrosion or deterioration of either material or finishes.
- B. Fabricate sheet metal roofing tiles to allow for expansion in running work sufficient to prevent leakage, damage, and deterioration of the Work. Form exposed sheet metal work to fit substrates without excessive oil canning, buckling, and tool marks, true to line and levels indicated, and with exposed edges folded back to form hems.
 - 1. Form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashing, and other components of metal roofing to profiles, patterns, and drainage arrangements shown and as required to resist Water infiltration without excessive use of sealants (dry Joints) while also allowing any water infiltration behind the roof panels to weep out
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with non-acidic sealant (concealed within joints) if determined to be necessary for weather-tight detail (dry joints are often acceptable).
- D. Sealant Joints: Where movable, non-expansion-type joints are indicated or required to produce weather tight seams, form metal to provide for proper installation of elastomeric sealant in compliance with SMACNA standards. In general, panel joints are intended to be dry, sealant-free, to facilitate air movement and drying behind the flat lock roof tiles.

PART 3 – EXECUTION

3.01 INSPECTION

- A. Contractor shall inspect all surfaces, areas and other contingent construction in or to which his work is to be installed and insure himself that they are in proper condition to receive the work to be performed under this Section.
- B. Verify that sheathing surfaces are sound, dry, properly secured and that provision has been made for flashings, anchorage, and all other interface items attaching to or penetrating through the Work of this Section.
- C. To the greatest extent possible, Contractor and installer shall inspect roof deck before roof underlayment is applied. Installer shall the Contractor of any deck, penetration, or other sub state condition requiring corrective action. Failure to make such an inspection shall be construed as acceptance of the existing conditions and the responsibility to provide an acceptable installation.

3.02 PREPARATION

- A. Verify field dimensions before fabrication. Notify Architect of any discrepancies between field measurements and dimensions indicated in Construction Documents.
- B. Place [permeable, synthetic, waterproof] underlayment membrane and venting mat on substrate surfaces to receive metal panels; comply with manufacturer's instructions.
 - 1. Coordinate installation of underlayment with metal roofing, rain drainage work, flashing, trim and construction of parapets, walls, and other adjoining work to provide a weatherproof, secure and non-corrosive installation.
 - 2. For underlayment end-laps and side-laps, see underlayment manufacturer's instructions for proper attachment, seaming, and termination recommendations.
 - 3. Apply weather barrier underlayment parallel to the eave.
- C. For loose-laid mechanically attached sheets, consult the architect for strategies preventing moisture infiltration through fastener holes. Potential solutions include but not limited to: applying sealant or self-adhered gaskets to backside of clips.

3.03 FIELD FABRICATION

- A. Form panels and flashings in shop to greatest extent possible. Field modify only as necessary.
- B. Ensure material temperature has moderated above 48 degrees F. prior to field fabrication.
- C. Cut prefabricated zinc tiles, and flashing with smooth (non-serrated) blade shears and snips. Bend zinc so that there are properly sized radius bends. Inspect initial panel and flashing bends to ensure material cracking has not occurred. NO SHARP BENDS
- D. Form rounded cuts and notches as made by MASC notching tool and demonstrated during zinc manufacturer fabrication training. Rounded cuts & notches are also possible by cutting to a predrilled hole.

3.04 INSTALLATION

- A. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of sheet metal being fabricated and installed.
 - 1. Do not install in inclement weather.
 - 2. Do not install over a damp substrate.
 - 3. Do not install when inclement weather is threatening.
 - 4. If covering of zinc panels is required, provide free airflow around the zinc material to manufacturer's requirement to prevent white rust.
- B. Install work to be truly straight and square or conform to curvilinear geometry indicated on drawings.
 - 1. Fabricate and install work with lines and corners of exposed units true and accurate.
 - 2. Form exposed faces free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal.
 - 3. Shim and align panel units within installed tolerance of ¼ inch in 20' -0"
 - 4. All seams shall be of uniform appearance and dimensions, straight and level with minimum exposure of solder and sealant.

5. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
 6. Form all seams to be weatherproof, leaving room for expansion and contraction with specified and required tolerances.
 7. Comply with RHEINZINK Division 7 Binder; latest edition and SMACNA Architectural Sheet Metal Manual; latest edition for flashings and sheet metal work.
- C. Conceal fasteners and expansion provision where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- D. To avoid material tearing, provide cuts with rounded notching tool or cut to pre-drilled hole.
- E. Provide work as indicated on approved shop drawings form and fabricate sheets, seams, strips, cleats, edge treatments, integral flashings, and other components of metal panels to profiles, patterns, and drainage arrangements shown and as required for water shedding construction.
- F. Ensure that all shop and field fabricated bends have an acceptable "rounded" or radius bend. NO SHARP BREAKS
- G. Separate non-compatible materials with a rubberized asphalt underlayment.
- H. Install work to meet specified performance requirements.

3.05 CLEANING AND PROTECTION

- A. Remove protective film (if any) from exposed surfaces of metal panels promptly upon installation (or prior if film covers any concealed seam areas) with care to avoid damage to finish.
- B. Follow Manufacturer's Cleaning Instructions.
- C. Ensure that cleaning by other trades working in proximity to zinc installation is in accordance with the recommendations of the zinc manufacturer.
- D. Damaged units: Replace panels and other components of the work that have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair.
- E. Follow manufacturer's recommended storage and handling instructions.

3.06 RECYCLING

- A. Collect all zinc drop-offs (scrap) and return to local scrap metal recycling facility for current market cash return.

3.07 CLEAN-UP

- A. During the progress of the work, keep premises clear of debris resulting from this operation and remove surplus and waste materials from the site as soon as possible.
- B. Upon completion of the work, Contractor shall remove from the site all equipment and materials used on the work as well as any debris resulting from the operations.

-END OF SECTION-