

UL Evaluation Report

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1. SUBJECT:

**ANTICA, BOND, CLASSIC, CRAFTSMAN SHAKE, ROYAL, SHAKE CF, SHINGLE, SHINGLE CF,
AND TUDOR METAL ROOFING PANELS**

2. SCOPE OF EVALUATION:

- 2012, 2009, and 2006 *International Building Code*® (IBC)
- 2012, 2009, and 2006 *International Residential Code*® (IRC)
- ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- ICC-ES Acceptance Criteria for Metal Roof Coverings (AC166), dated October 2012



The products were evaluated for the following properties:

- Roofing Systems for Exterior Fire Exposure (ANSI/UL790, ASTM E108)
- Roof Deck Construction (ANSI/UL 580)
- Wind Uplift Resistance (ANSI/UL 1897)
- Corrosion Resistance (ASTM B117)
- Weathering Performance (ASTM G155)
- Wind Driven Rain Resistance (TAS 100)

3. REFERENCED DOCUMENTS

- ICC-ES:
 - ICC-ES Acceptance Criteria for Metal Roof Coverings (AC166), dated October 2012
 - ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014
- ANSI/UL:
 - ANSI/UL 580, Fifth Edition, Standard for Tests for Uplift Resistance of Roof Assemblies
 - ANSI/UL 1897, Fourth Edition, Uplift Tests for Roof Covering Systems
 - ANSI/UL790, Seventh Edition (ASTM E108-07a), Standard Test Methods for Fire Tests of Roof Coverings
- ASTM:
 - ASTM A653/A653M-08, *Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process*
 - ASTM B117-11, *Standard Practice for Operating Salt Spray (Fog) Apparatus*
 - ASTM G155-05a, *Standard Practice for Operating Xenon Arc Light Apparatus for Exposure of Non-Metallic Materials*
- Florida Building Code:
 - Test Protocols for the High Velocity Hurricane Zone (HVHZ) Testing Application Standard (TAS) No.100-95: *Test Procedure for Wind and Wind Driven Rain Resistance of Discontinuous Roof Systems*

4. USES

Antica, Bond, Classic, Craftsman Shake, Royal, Shake CF, Shingle, Shingle CF, and Tudor metal roofing panels are used as roof covering materials in Class A, B, or C roofing systems when installed in accordance with this report and the manufacturer's published installation instructions.

5. PRODUCT DESCRIPTION

Tilcor North America's roofing panels described in this report are formed stone-coated metal formed from ASTM A792 AZ150M hot-dip Commercial Steel Type B sheet. The panels are manufactured in different profile shapes and have a base metal thickness not less than 0.0165 inches (0.420 mm). The panels are metal roof coverings complying with [Section 1507.4](#) of the 2012, 2009, and 2006 IBC and [Section R905.10](#) of the 2012, 2009, and 2006 IRC. The individual profile descriptions are listed below.

5.1 Antica

Antica metal roofing panels are nominally 52.4 inches (1290 mm) long by 16.3 inches (432 mm) wide, having an exposure area of 47.8 inches (1215 mm) long by 16.9 inches (428 mm) wide. Each tile is nominally 6.61 lbs (3.0 kg) with an installed weight of 136 lbs per square (6.65 kg/m²). Antica panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 1](#).

5.2 Bond

Bond metal roofing panels are nominally 52.2 inches (1325 mm) by 16.8 inches (425 mm) wide, having an exposure area of 49.8 inches (1265 mm) long by 14.5 inches (368 mm) wide. Each tile is 6.39 lbs (2.9 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Bond panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 2](#).

5.3 Classic

Classic metal roofing panels are nominally 52.2 inches (1325 mm) long by 16.5 inches (418 mm) wide, having an exposure area of 49.7 inches (1262 mm) long by 14.5 inches (368 mm) wide. Each tile is 6.64 lbs (3 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Classic panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 3](#).

5.4 Craftsman Shake

Craftsman Shake metal roofing panels are nominally 52.6 inches (1335 mm) long by 16.8 inches (411 mm) wide, having an exposure area of 49.6 (1260 mm) inches by 14.5 inches (368 mm) wide. Each tile is 6.39 lbs (2.9 kg) with an installed weight of 128 lbs per square (6.26 kg/m²). Craftsman Shake panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 4](#).

5.5 Royal

Royal metal roofing panels are nominally 52.6 inches (1335 mm) long by 16.5 inches (420 mm) wide, having an exposure area of 49.6 (1265 mm) inches by 14.5 inches (368 mm) wide. Each tile is nominally 6.61 lbs (3 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Royal panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 5](#).

5.6 Shake CF

Shake CF metal roofing panels are nominally 52.6 inches (1335 mm) long by 16.7 inches (424 mm) wide, having an exposure area of 49.6 (1260 mm) inches by 14.6 inches (370 mm) wide. Each tile is nominally 6.61 lbs (3.0 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Shingle panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 6](#).

5.7 Shingle

Shingle metal roofing panels are nominally 52.8 inches (1340 mm) long by 11.4 inches (290 mm) wide, having an exposure area of 49.2 (1250 mm) inches by 9.8 inches (250 mm) wide. Each tile is nominally 4.40 lbs (2.0 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Shingle panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 7](#).

5.8 Shingle CF

Shingle CF metal roofing panels are nominally 52.6 inches (1335 mm) long by 16.6 inches (422 mm) wide, having an exposure area of 49.6 (1260 mm) inches by 14.6 inches (370 mm) wide. Each tile is nominally 6.61 lbs (3.0 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Shingle panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 8](#).

5.9 Tudor

Tudor metal roofing panels are nominally 52.4 inches (1335 mm) long by 16.7 inches (425 mm) wide, having an exposure area of 49.8 (1265 mm) inches by 14.5 inches (368 mm) wide. Each tile is nominally 6.61 lbs (3.0 kg) with an installed weight of 132 lbs per square (6.5 kg/m²). Tudor panels may be used in assemblies having a slope of 3:12 and greater. See [Detail Sequence 9](#).

Fire Classification: Tilcor North America's metal roofing panels covered under this report have been tested for fire classifications Class A, B, and C in accordance with ANSI/UL790 (ASTM E108) and qualify for use under [Section 1505.1](#) of the 2012, 2009 and 2006 IBC and [Section R902.1](#) of the 2012, 2009 and 2006 IRC. Refer to [Table 1](#).

Wind Resistance: Roofing assemblies shall be designed to resist the design wind load pressures for components and cladding in accordance with [Section 1609.5](#) and [Section 1504.3](#) of the 2012, 2009 and 2006 IBC and [Section R905.1](#) of the 2012, 2009 and 2006 IRC.

Wind Uplift Resistance: Tilcor North America's metal roofing panels covered under this report have been tested for wind uplift resistance in accordance with ANSI/UL 580/1897 complying with [Section 1504.3.2](#) of the 2012, 2009, and 2006 IBC. Refer to [Table 2](#).

Wind Driven Rain Resistance: Tilcor North America's metal roofing panels covered under this report have been tested for wind driven rain resistance in accordance with Test Application Standard (TAS) 100. [Table 3](#) provides additional installation details for trim and edge treatments.

Physical Properties: Tilcor North America's metal roofing panels covered under this report have been tested for the following performance requirements for metal panel roof systems.

- **Accelerated Weathering:** Tilcor North America's metal roofing panels covered under this report have passed the criteria for accelerated weathering in accordance with [Section 1504.6](#) of the IBC.
- **Corrosion Resistance:** Tilcor North America's metal roofing panels complying with [Section 1507.4.3](#) of the 2012, 2009, and 2006 IBC and [Section 905.10.3](#) of the 2012, 2009, and 2006 IRC covered under this report have been tested for resistance to corrosion in accordance with ASTM B117.

6. INSTALLATION

6.1 General

Tilcor North America's metal roofing panels must be installed in accordance with [Section 1507.4](#) of the 2012, 2009 and 2006 IBC or [Section R905.6](#) of the 2012, 2009 and 2006 IRC, except as noted in this report, and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at all times on the jobsite during installation. The metal roofing panels must be attached to the decked sheathing in a manner that will secure the panels in place.

6.2 Slope

Products covered in this report are intended for roof decks having slopes of 3:12 or greater. Roof decks having slopes less than 3:12 are considered decorative, and require a permanent roofing membrane. Installation of Tilcor North America's metal roofing panels covered in this report are to be installed in accordance with [Section 1507.4.2](#) of the 2012, 2009, and 2006 IBC and [Section R905.10.2](#) of the 2012, 2009, and 2006 IRC.

6.3 Roof Deck

Roof decking is to be as described in [Section 1507.4.1](#) of the 2012, 2009, 2006 IBC and [Section R905.10.1](#) of the 2012, 2009, and 2006 IRC. The minimum required sheathing is to be ¹⁵/₃₂ inch plywood decking, or ⁷/₁₆ inch OSB. The sheathing must be structurally sound and adequately fastened to resist wind loads for components and cladding as specified in [Section 1609](#) of the 2012, 2009, and 2006 IBC and [Section R301.6](#) of the 2012, 2009, and 2006 IRC. Installations over spaced sheathing must incorporate lumber (as needed or as necessary), of the same thickness for filling in the gaps of the spaced sheathing to provide an adequate substrate for fastening of the metal roof covering.

6.4 Battens and Counter Battens

Wood battens must be nominal 2X2 standard grade Douglas Fir-Larch or better. Steel battens must be minimum 26 gauge [0.0179 in. (0.4275 mm)] hat-shaped sections with a minimum 1¹/₂ inch (38 mm) height. Counter-battens must be nominal 1X4 standard grade Douglas Fir-Larch or better. Battens and Counter Battens must be adequately fastened to resist wind loads.

6.5 Underlayment

An ice barrier must be installed along the eaves in locations historically prone to ice in accordance with [Section 1507.7.4](#) of the 2012, 2009 and 2006 IBC and [Section R905.5.3.1](#) of the 2012, 2009, and 2006 IRC. In addition to the ice barrier, an underlayment must be installed over the entire roof deck in accordance with [Section 1507.7.3](#) of the 2012, 2009, and 2006 IBC and [Section R905.6.3](#) of the 2012, 2009, and 2006 IRC.

Underlayments installed on roofs in locations prone to high winds must be installed in accordance with [Section 1507.4.5](#) of the 2012 IBC.

6.6 Flashing

Flashing materials are to be installed in accordance with [Section 1503.2](#) and [Section 1507.7.7](#) of the 2012, 2009, and 2006 IBC and [Section R903.2](#) and [Section R905.6.6](#) of the 2012, 2009, and 2006, as applicable.

6.7 Roofing Panels

Installation of the metal roofing can begin at the eave or ridge. Fascia metal is installed and fastened to the batten. The first course panels will cover the nails, and are nailed along the head check into the batten. The nose of the panels on the second course will cover the nails. Subsequent courses are to be installed in accordance with the manufacturer's instructions. Begin installing panels on the first full course down from the ridge by nailing through the head check. The second course down is installed by lifting the nose of the panel above and sliding into place.

6.8 Hips and Ridges

Hips and ridges must be installed in accordance with Tilcor North America's published installation instructions for exposure dimension and fastener type.

6.9 Fasteners

Attachment of the roof panels must be in accordance with [Section 1507.4.4](#) of the 2012, 2009, and 2006 IBC.

6.10 Reroofing

6.10.1

When existing roof coverings, other than asphalt shingles and built-up roofs, must be completely removed and panels are installed in accordance with Section 6, panels may be installed over existing spaced sheathing provided the space between boards is filled with lumber as necessary to provide a base for fastening. The fill lumber must be of the same thickness as the existing spaced sheathing.

6.10.2

Installation over existing asphalt shingles or built-up roofs is permitted provided the roof slope complies with Section 6.2, and the requirements of IBC [Section 1510](#) or IRC [Section R907](#) are met. The panels must be fastened through the existing roof covering to the roof sheathing in the same manner as described in Section 6 of this report, with screws or nails of sufficient length to penetrate the deck a minimum of 15/32 inch (11.9 mm). New flashing must be installed over and around all existing flashing, vents, valleys and chimneys in accordance with this report and the applicable code. Over existing built-up roof coverings, all loose gravel and debris must be swept off. Blisters in the plies must be cut and nailed flat. Raised perimeters, such as gravel stops, must be covered by the Tilcor North America steel panel roofing system.

6.10.3

Tilcor North America batten installed steel roofing panels may be installed over existing wood shake or wood shingle roofs, provided the roof slope complies with Section 6.2, and the requirements of IBC [Section 1510](#) or IRC [Section R907](#) are met.

When installation is over wood shake or wood shingle roofs, the entire existing roof surface must be covered with material in accordance with [Section 1510.4](#) of the 2012, 2009, and 2006 IBC or [Section R907.4](#) of the 2012, 2009, 2006 IRC after the installation of counter-battens and before the battens. Counter-battens must be securely fastened through the existing roof, and into the framing members or the sheathing as noted in Systems 9, 10, 11 or 12 in [Table 2](#). Nails and screws must be of sufficient length to penetrate at least 1 inch (25.4 mm) into the framing member below the existing wood roof system.

Battens are installed at a typical spacing of 14¹/₂ inches on center. The panels are secured to counter-battens as noted in Systems 9-12 in [Table 2](#).

7. CONDITIONS OF USE

7.1 General

The metal roofing panels described in this report comply with, or are suitable alternatives to, what is specified in those codes listed in Section 2 of this report, subject to the following conditions:

- 7.2** Materials and methods of installation must comply with this report and the manufacturer's published installation instructions. In the event of a conflict between the installation instructions and this report, this report governs.
- 7.3** Only Tilcor North America's specified fasteners shall be used in the installation of the roof covering system.

- 7.4 See the UL Online Certification Directory for Prepared Roof Covering Materials, Formed or Molded Metal, Fiber-Cement, Plastic or Fire-retardant-treated Wood ([TFXX](#)), Roof-covering Materials, Impact Resistance ([TGAM](#)), Roof Deck Constructions for Metal Roof Deck Panels ([TJPV](#)), and Roofing Systems, Uplift Resistance ([TGIK](#)).
- 7.5 Wind uplift pressures on any roof area, including edges and corner zones shall not exceed the allowable wind pressure for the roof covering installed in that particular area. The allowable wind uplift pressure for the roof assembly is based on a minimum factor of safety of 2.0 as applied in [Table 2](#). The allowable wind uplift pressure is for the roof system only. The sheathing and framing to which the roofing system is attached shall be designed for the allowable wind loads in accordance with the applicable code.
- 7.6 The metal roofing panels covered under this report are produced by Ross Roof Group, Auckland, NZ, under the UL LLC Listing/Classification and Follow-Up Service Program, which includes audits in accordance with quality elements of ICC-ES Acceptance Criteria for Quality Documentation, AC10.

8. SUPPORTING EVIDENCE

- 8.1 Data in accordance with ICC-ES Acceptance Criteria for Metal Roof Coverings (AC166), dated October 2012.
- 8.2 Manufacturer's descriptive product literature, including installation instructions.
- 8.3 Documentation of quality system elements described in ICC-ES Acceptance Criteria for Quality Documentation (AC10), dated June 2014.
- 8.4 UL Certification reports in accordance with ANSI/UL 790, UL 2218, UL 580, and UL 1897. See the UL Product Certification Categories (TFXX), (TGAM), (TJPV), and (TGIK), respectively.
- 8.5 Test reports in accordance with ANSI/UL 1897.

9. IDENTIFICATION

Tilcor North America's metal roofing panels described in this evaluation report are identified by a marking bearing the report holder's name (Ross Roof Group DBA Tilcor North America) and address, the product name, , the UL Certification Mark , and the evaluation report number UL ER38401-01. The validity of the evaluation report is contingent upon this identification appearing on the product or UL Classification Mark certificate.

10. USE OF UL EVALUATION REPORT

- 10.1 The approval of building products, materials, or systems is the responsibility of the applicable authorities having jurisdiction.
- 10.2 UL Evaluation Reports shall not be used in any manner that implies an endorsement of the product, material or system by UL.
- 10.3 The current status of this report, as well as a complete directory of UL Evaluation Reports may be found at UL.com via the On-Line Certifications Directory at www.ul.com/erdirectory.

TABLE 1: FIRE RATED COMBUSTIBLE DECK ASSEMBLIES

System Number	Substrate	Insulation or Barrier Board	Underlayment ¹	Unlimited Incline
Antica, Bond, Classic, Craftsman Shake, Royal, Shake CF , Shingle, Shingle CF , or Tudor				ANSI/UL 790
1	APA stamped min. $1\frac{5}{32}$ inch CDX plywood, min. $\frac{7}{16}$ inch OSB, or min. nominal 1 inch spaced sheathing	None	One layer of GAF "VersaShield" underlayment or one layer of GAF VersaShield Solo mechanically fastened.	Class A
2			Minimum $\frac{1}{2}$ inch thick UL Classified gypsum board or minimum $\frac{1}{4}$ inch thick G-P Gypsum DensDeck[®]	Class A
3			Existing wood shake or wood shingle roof	One layer of GAF "VersaShield" underlayment or one layer of GAF VersaShield Solo mechanically fastened.
4	APA stamped min. $1\frac{5}{32}$ inch CDX plywood, min. $\frac{7}{16}$ inch OSB, or min. nominal 1 inch spaced sheathing	Minimum $1\frac{1}{2}$ inch thick UL Classified fiberglass foil-faced batt insulation	Any UL Classified underlayment	Class B
5		None		Class C
6				Existing roof covering²

¹Underlayment fastening for wind resistance in Table 2: 32 GA, 1-⁵/₈ inch Ø tin cap nails with 12 GA, 1-¹/₄ inch ring-shank nails 6 inches O.C. in the 4 inch wide lap seams, with two additional rows in the field at 12 inches O.C.

²Roof cover is not suitable for use over existing wood shakes or wood shingles.

³New roof cover retains the fire classification based on the fire resistance rating of the existing roof cover system.

**TABLE 2: WIND UPLIFT RESISTANCE ROOF DECK¹ ASSEMBLIES -
DIRECT TO DECK**

System Number	Panel Fastening ²		Maximum Design Pressure ³
	Tab Fastening	Stitch Fastening	
Antica, Bond, Classic, Craftsman Shake, Royal, or Tudor⁴			ANSI/UL 580/1897
1	(4) #12-8 x 1 ¹ / ₄ inch hex washer head screws 4 inches from either end and 15 inches O.C. in the factory tabs into the wood deck	(4) #9-16 x 1 ¹ / ₂ inch hex washer head screws stitch fastened 1 inch from either end and 17 inches O.C. through the nose attaching the preceding course	-75
2	(7) #12-8 x 1 ¹ / ₄ inch hex washer head screws 4 inches from either end and 15 inches O.C. in the factory tabs into the wood deck	(7) #9-16 x 1 ¹ / ₂ inch hex washer head screws stitch fastened 1 inch from either end and 8- ¹ / ₂ inches O.C. through the nose attaching the preceding course	-97.5
Shingle⁵			ANSI/UL 580/1897
3	(6) #12-10 x 1 ¹ / ₂ inch hex washer head screws 1 inch from either end and 8 inches O.C. in the factory flange into the wood deck ⁶	Factory interlock at the nose	-108.75
4	(8) #12-10 x 1 ¹ / ₂ inch hex washer head screws 1 inch from either end and 7 inches O.C. in the factory flange into the wood deck ⁶	Factory interlock at the nose	-142.5
5	(5) 0.113 x 2 ³ / ₈ inch ring shank nails spaced 1 inch from either end and 10- ¹ / ₂ inches O.C. through the headlap and into the wood deck ⁶	Factory interlock at the nose	-45

¹APA stamped minimum ¹⁵/₃₂ inch CDX plywood fastened on all edges and at mid-span to framing 6 inches oc with 2³/₈ inch #8d annular ring shank nails.

²All fasteners must be corrosion resistant. Nails must comply with ASTM F1667. Wood screws must comply with ANSI/ASME B18.6.1. Sheet metal screws must comply with ANSI/ASME B18.6.4.

³The maximum design wind uplift pressure applies a safety factor of 2 to the maximum tested load achieved without failure.

⁴Panels applied having 14¹/₂ inch exposure and an approximate 3 inch adjacent overlap.

⁵Panels applied having 9⁷/₈ inch exposure and an approximate 3¹/₂ inch adjacent overlap.

⁶Stated quantity includes one fastener installed into the overlap.

**TABLE 2: WIND UPLIFT RESISTANCE ROOF DECK¹ ASSEMBLIES -
DIRECT TO DECK (continued)**

System Number	Panel Fastening ²		Maximum Design Pressure ³
	Tab Fastening	Stitch Fastening	
Shingle CF or Shake CF ⁴			ANSI/UL 580/1897
6	(8) #12-10 x 1 ¹ / ₂ inch hex washer head screws spaced 1 inch from either end and 7 inches O.C. through the headlap and into the wood deck	Factory interlock at the nose	-37.5
7	(5) #12-10 x 1 ¹ / ₂ inch hex washer head screws spaced 2 ¹ / ₂ inches from either end and 10 inches O.C. through the headlap and into the wood deck	Factory interlock at the nose	-82.5
8	(9) ⁵ #12-10 x 1 ¹ / ₂ inch hex washer head screws spaced 1 inch from either end and 5 ¹ / ₂ inches O.C. through the headlap and into the wood deck	Factory interlock at the nose	-120

¹APA stamped minimum ¹⁵/₃₂ inch CDX plywood fastened on all edges and at mid-span to framing 6 inches oc with ²³/₈ inch #8d annular ring shank nails.

²All fasteners must be corrosion resistant. Nails must comply with ASTM F1667. Wood screws must comply with ANSI/ASME B18.6.1. Sheet metal screws must comply with ANSI/ASME B18.6.4.

³The maximum design wind uplift pressure applies a safety factor of 2 to the maximum tested load achieved without failure.

⁴Panels applied having 14¹/₂ inch exposure and an approximate 3 inch adjacent overlap.

⁵Stated quantity includes one fastener installed into the overlap.

**TABLE 2: WIND UPLIFT RESISTANCE ROOF DECK¹ ASSEMBLIES -
BATTEN OR BATTEN/COUNTER-BATTEN SYSTEMS**

System Number	Batten ² / Counter-Batten Attachment	Panel Fastening ³	Maximum Design Pressure ⁴
Antica, Bond, Classic, Craftsman Shake, Royal, Shingle, or Tudor ⁵			ANSI/UL 580/1897
9	(1) #9 x 3 ¹ / ₄ inch torx bugle head screw 24 inches O.C. into wood joists	(4) 8d ⁶ x 2 ¹ / ₂ inch ring-shank nails 1 inch from either end and 17 inches O.C. into the nose of the panel, through the preceding course, and into the wood batten	-75
10	(2) #9 x 3 ¹ / ₄ inch torx bugle head screw 24 inches O.C. into wood joists	(7) 8d ⁶ x 2 ¹ / ₂ inch ring-shank nails 1 inch from either end and 8 ¹ / ₂ inches O.C. into the nose of the panel, through the preceding course, and into the wood batten	-135
11	(1) 12d ⁶ x 3 ¹ / ₄ inch smooth shank framing nail 24 inches O.C. into wood joists	(4) 8d ⁶ x 2 ¹ / ₂ inch ring-shank nails 1 inch from either end and 17 inches O.C. into the nose of the panel, through the preceding course, and into the wood batten	-37.5
12	Counter-battens-Nominal 1 x 4 dimensional lumber, No. 2 or better, 24 inches O.C. above wood joists, fastened with 0.131 x 3 ⁻¹ / ₄ inch smooth shank nails 7 ⁻¹ / ₂ inches O.C. into wood joists. Battens-Nominal 1 ⁻¹ / ₂ inch x 1 ⁻¹ / ₂ inch wood bars spaced 14 ⁻¹ / ₂ inches O.C. mechanically fastened with one #10 x 3 ⁻¹ / ₂ inch torx bugle head screw 24 inches O.C. through counter-batten into wood joists.	(5) 8d 0.113 x 2 ¹ / ₄ inch ring-shank nails per panel into the nose, through the headlap of the preceding panel and into the batten, spaced one inch from either end and 10 ⁻¹ / ₈ inches O.C. in between.	-120

¹APA stamped minimum ¹⁵/₃₂ inch CDX plywood fastened on all edges and at mid-span to framing 6 inches oc with 2³/₈ inch #8d annular ring shank nails.

²Battens are to be minimum nominal 2X2 Douglas Fir-Larch or better.

³All fasteners must be corrosion resistant. Nails must comply with ASTM F1667. Wood screws must comply with ANSI/ASME B18.6.1. Sheet metal screws must comply with ANSI/ASME B18.6.4.

⁴The maximum design wind uplift pressure applies a safety factor of 2 to the maximum tested load achieved without failure.

⁵Panels applied having 14¹/₂ inch exposure and an approximate 3 inch adjacent overlap.

⁶Ring shank nail diameter minimum 0.131 inches.

TABLE 3: WIND DRIVEN RAIN RESISTANCE¹

Roof Location/Detail	Component Description	Component Attachment	Additional Detail	Wind Driven Rain Resistance (HVHZ)
Antica, Bond, Classic, Craftsman Shake, Royal, or Tudor²				TAS 100
Eave	Stone coated trim having 3 ¹ / ₂ inch vertical face and 1 inch fastening flange	12d common smooth shank nail 5 inches oc into batten	At eave/valley intersection, eave trim was mitered to allow valley metal to pass through and folded down over fascia. First course of metal panels attached to starter batten ³ and through eave trim	Pass
Rake ^{3,4,5}	Pre-formed 26 ga. rake edge metal having (4) "V" folds with returns on each side	#10-16 X 1 ¹ / ₂ inch hex head fasteners 1 inch from the side between the outermost "V" fold and the return	Roof cover panels installed into rake edge, and folded down into the drip channel	
Valley ⁶	Pre-formed 26 ga. valley metal having (4) "V" folds with returns on each side	#10-16 X 1 ¹ / ₂ inch hex washer head fasteners 1 inch from the side between the outermost "V" fold and the return	Valley contained a 5 inch end lap, was sealed with 1/2 inch bead of ASTM C920 sealant, and folded to ensure wind-driven rain resistance The 1 inch X 2 ¹ / ₂ inch closure material was placed between "V" folds	

¹Deck, underlayment, battens, fasteners and roof covering materials and installation methods are to comply with [Table 2](#). Minimum slope is 3:12.

²Panels applied having 14¹/₂ inch exposure and an approximate 3 inch adjacent overlap.

³Nominal 2X2 wood counter-batten applied parallel to rake edge and atop battens. Additional underlayment ASTM D1970 underlayment applied over mechanically fastened roofing felt in half sheet widths extending 2 inches down the fascia.

⁴Metal roof cover material bent over counter-batten.

⁵ASTM C920 elastomeric sealant used to seal any fasteners and gaps at detail intersections.

⁶Additional underlayment ASTM D1970 underlayment applied over mechanically fastened roofing felt in full sheet widths. Metal panels bent 1¹/₂ inch to valley pan.

TABLE 3: WIND DRIVEN RAIN RESISTANCE¹ (continued)

Roof Location/Detail	Component Description	Component Attachment	Additional Detail	Wind Driven Rain Resistance (HVHZ)
Shingle, Shingle CF, Shake CF²				TAS 100
Eave	Stone coated trim having 2 inch vertical face, 2 inch overhang face, and 4³/₄ inch fastening flange	12 ga. ring shank nail 6 inches oc 1 inch from edge	At eave/valley intersection, eave trim installed over drip metal.	Pass
Rake^{3, 4}	Pre-formed rake trim, stone-coated 3-¹/₂ inch vertical face and 3 inch flange	rake trim stitch fastened to metal roof cover with ³/₈ inch stitch screw 20 inches oc, 1 inch from edge	rake trim installed over roof cover panel and rake board	
Valley⁵	Pre-formed 14 inch wide 26 ga. valley metal having (2) "V" folds with returns on each side of centerfold	12 ga. 1¹/₄ ring shank nail 2 inches from the side between outermost "V" and the return	Valley contained a 5 inch end lap, was sealed with ½ inch bead of sealant, and folded to ensure wind-driven rain resistance. Valley metal slit and folded down the fascia approximately 2 inches at eave/rake intersection, and sealed with sealant.	

¹Deck, underlayment, battens, fasteners and roof covering materials and installation methods are to comply with [Table 2](#). Minimum slope is 3:12.

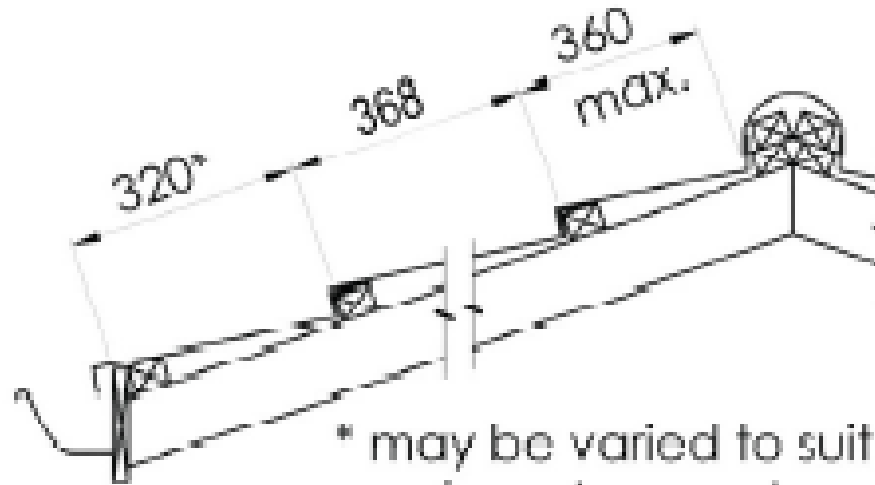
²Panels applied direct to deck having 9⁷/₈ or 14¹/₂ inch exposure with an approximate 3¹/₂ inch adjacent overlap.

³Trim fastened to rake board w No. 12-10 X 1¹/₂ inch hex head/bonded washer fastener 14 inches oc, 1 inch from edge.

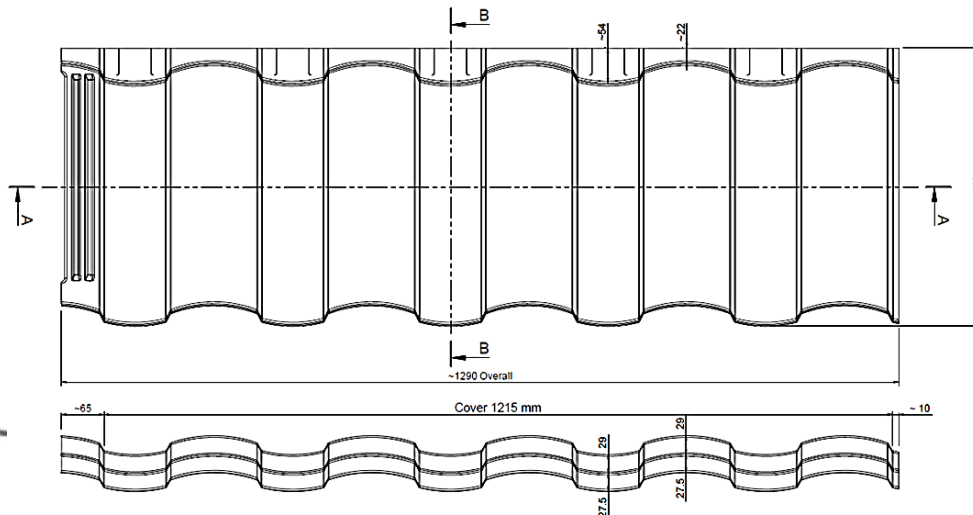
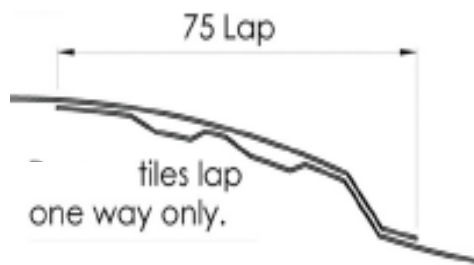
⁴ASTM C920 elastomeric sealant used to seal any fasteners and gaps at detail intersections.

⁵Additional underlayment ASTM D1970 underlayment applied over mechanically fastened roofing felt in full sheet widths. Metal panels bent 1¹/₂ inch to valley pan.

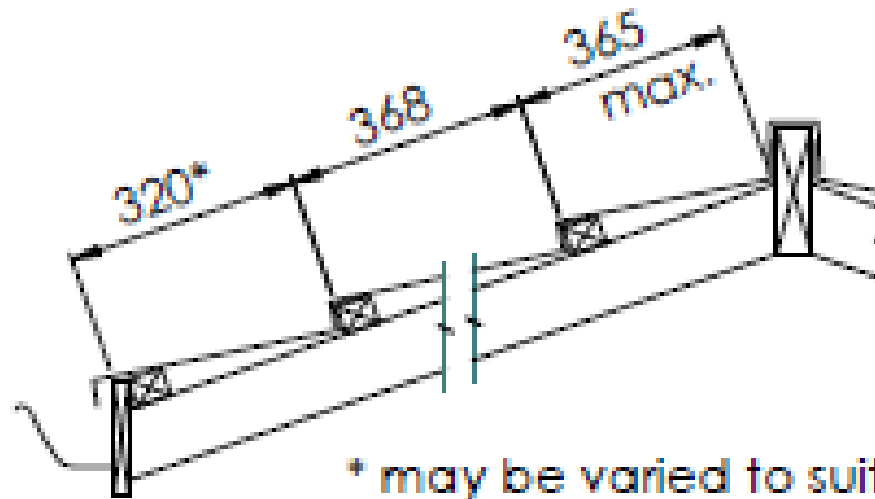
Detail Sequence 1



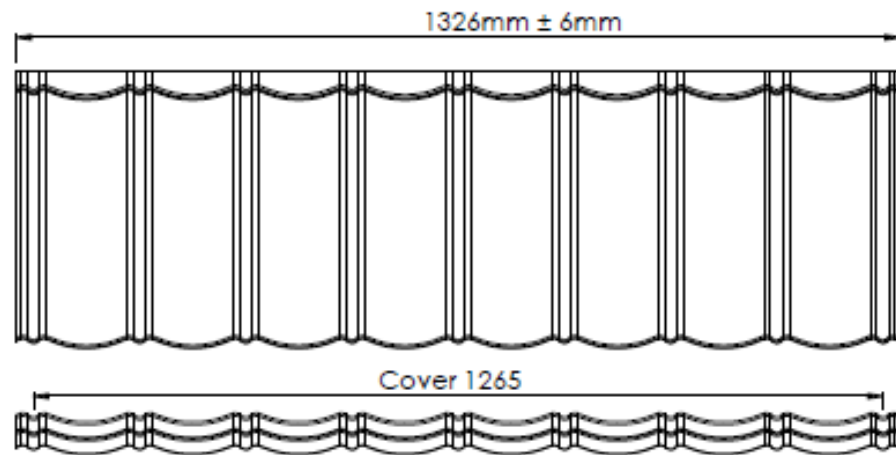
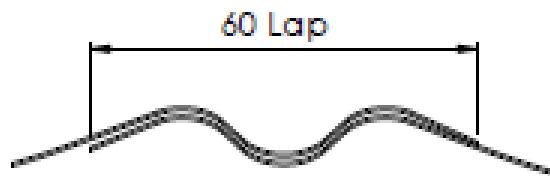
* may be varied to suit rain water goods



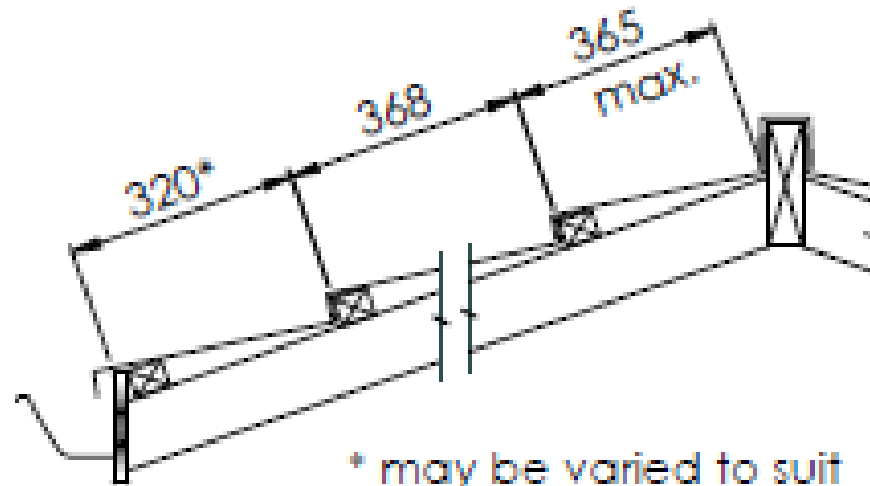
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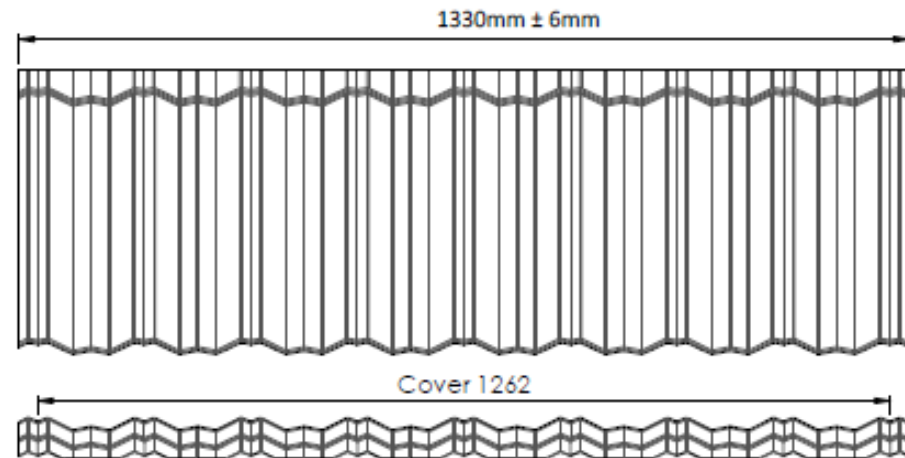
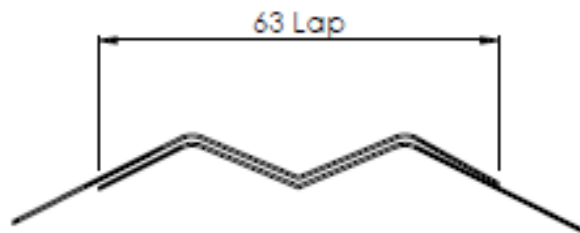
* may be varied to suit
rain water goods



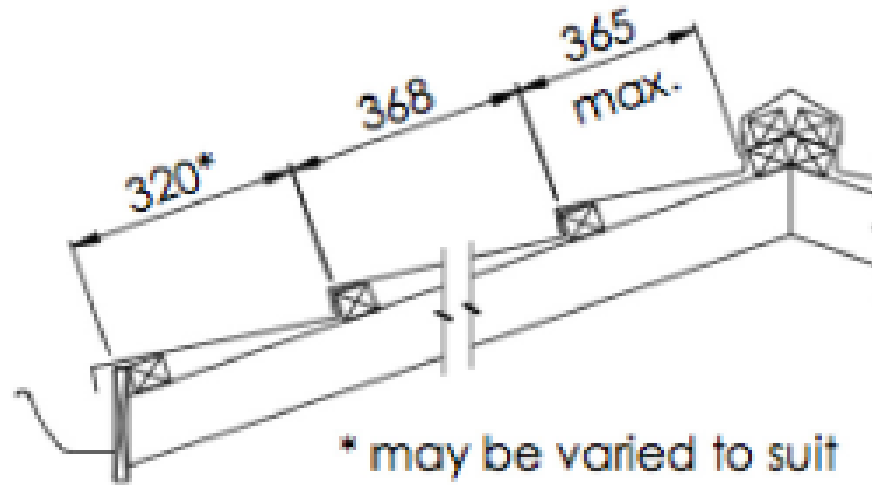
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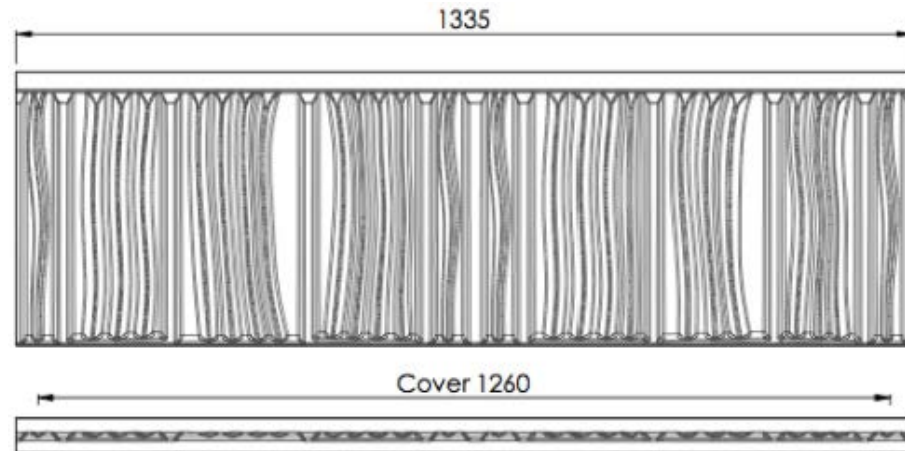
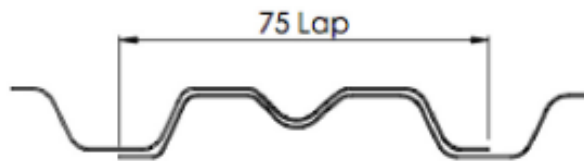
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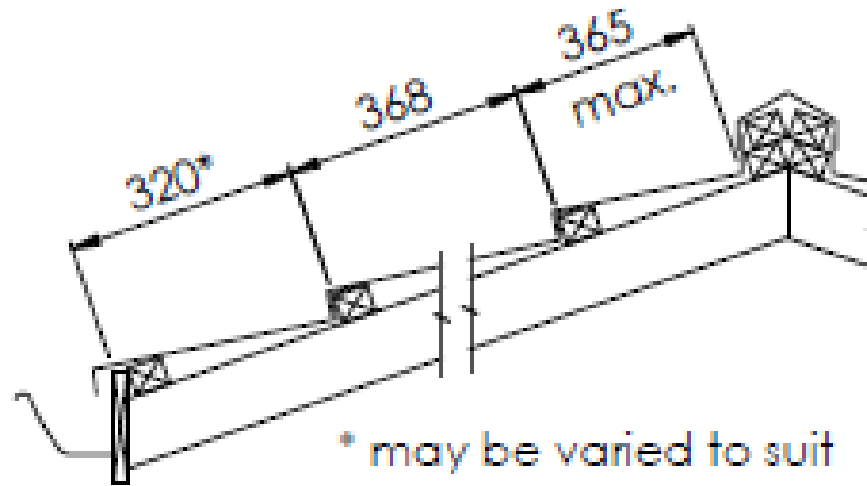
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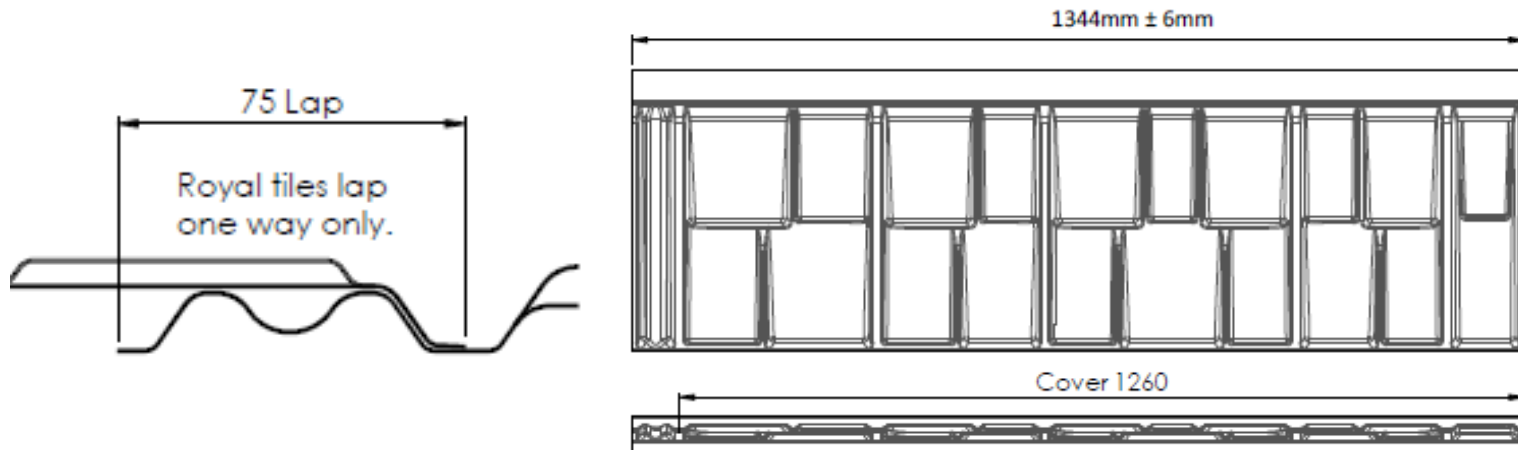
* may be varied to suit
rain water goods



Detail Sequence 5



* may be varied to suit rain water goods



Detail Sequence 6

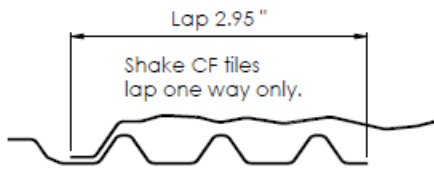
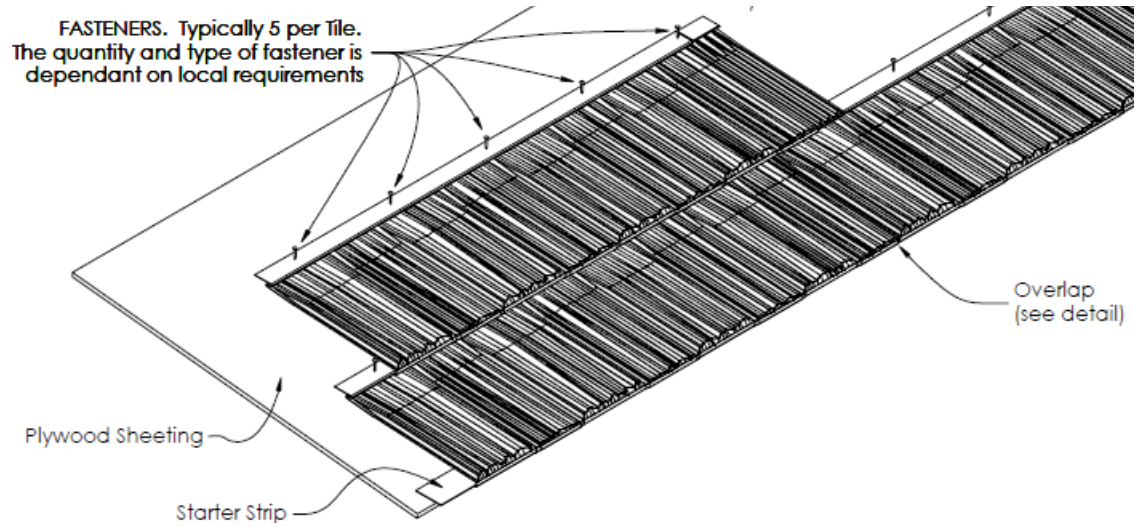
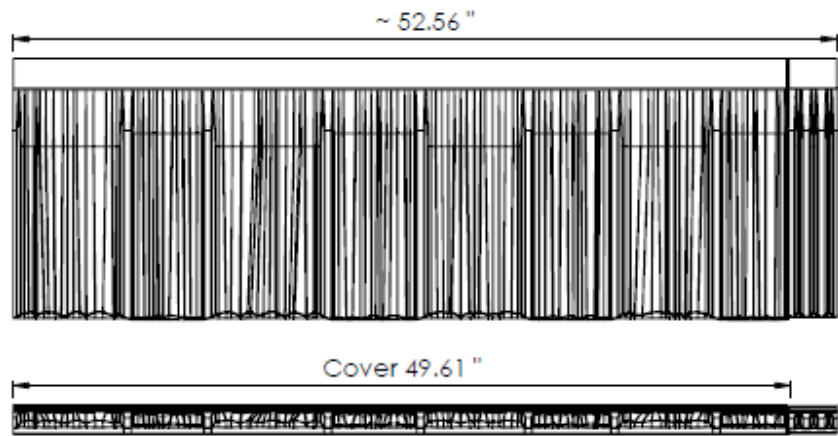
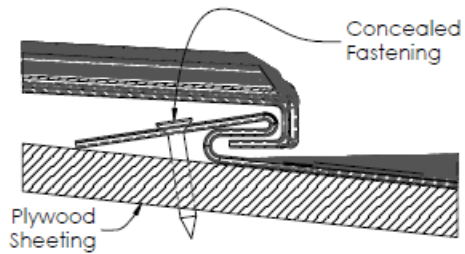
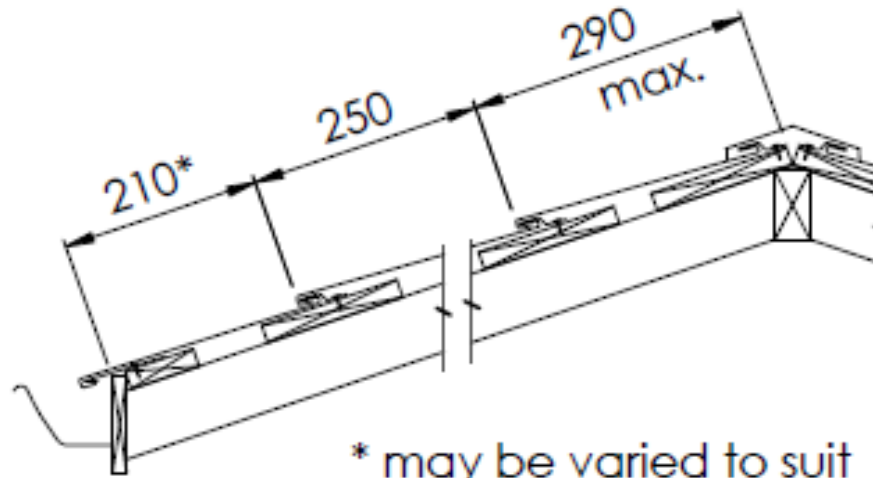


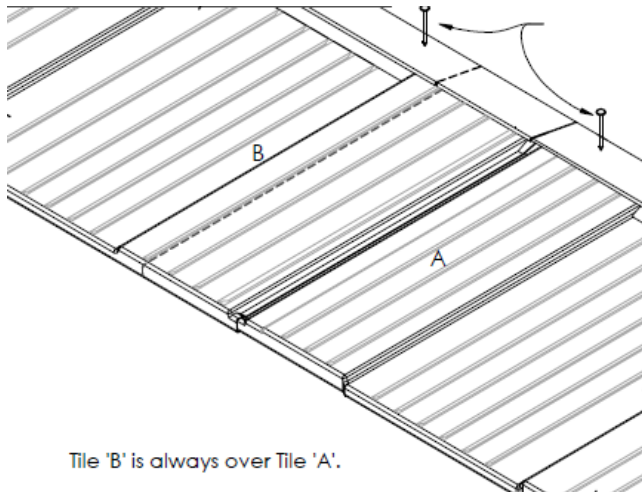
Figure 11.4 Side Lap Detail



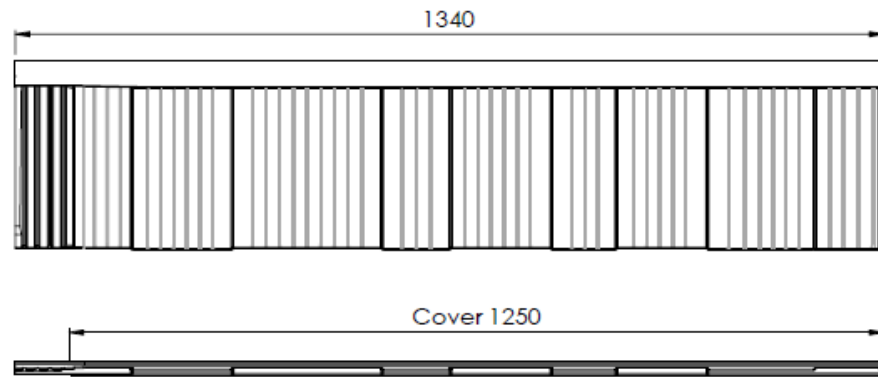
Detail Sequence 7



* may be varied to suit rain water goods



Tile 'B' is always over Tile 'A'.



Detail Sequence 8

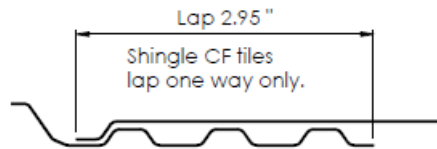
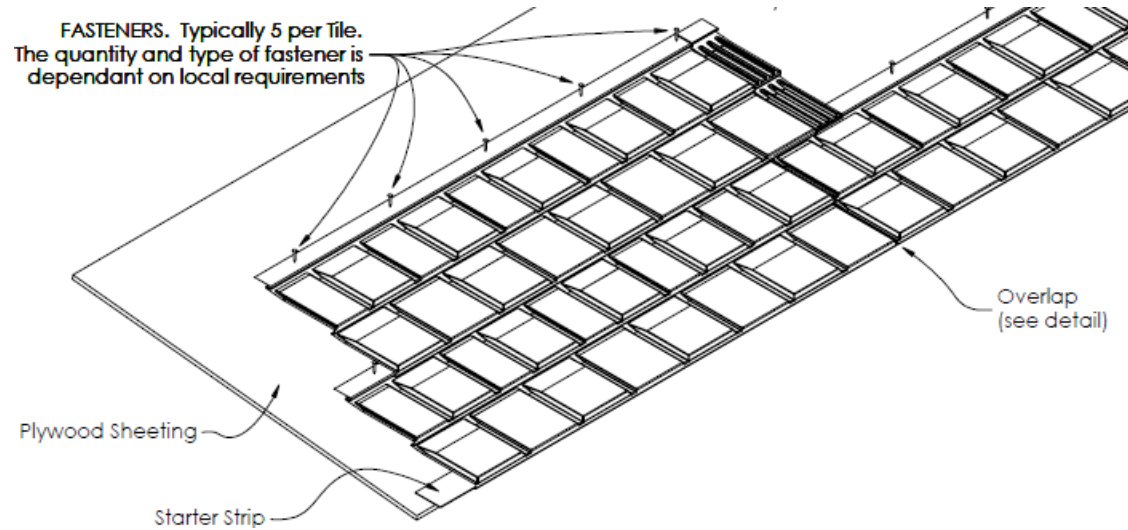
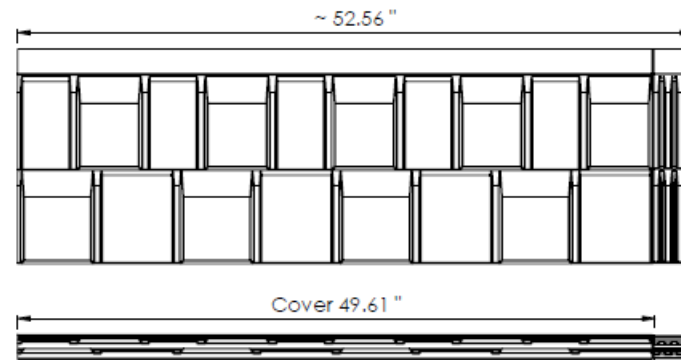
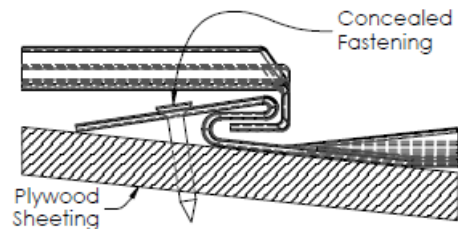
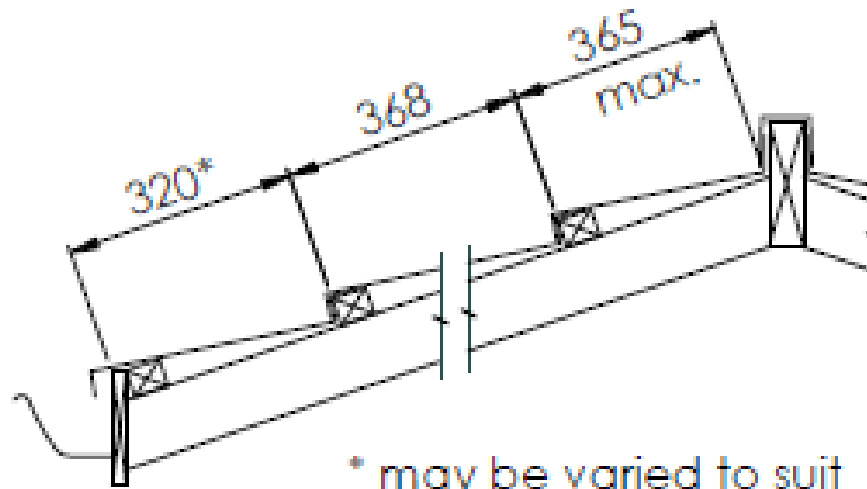


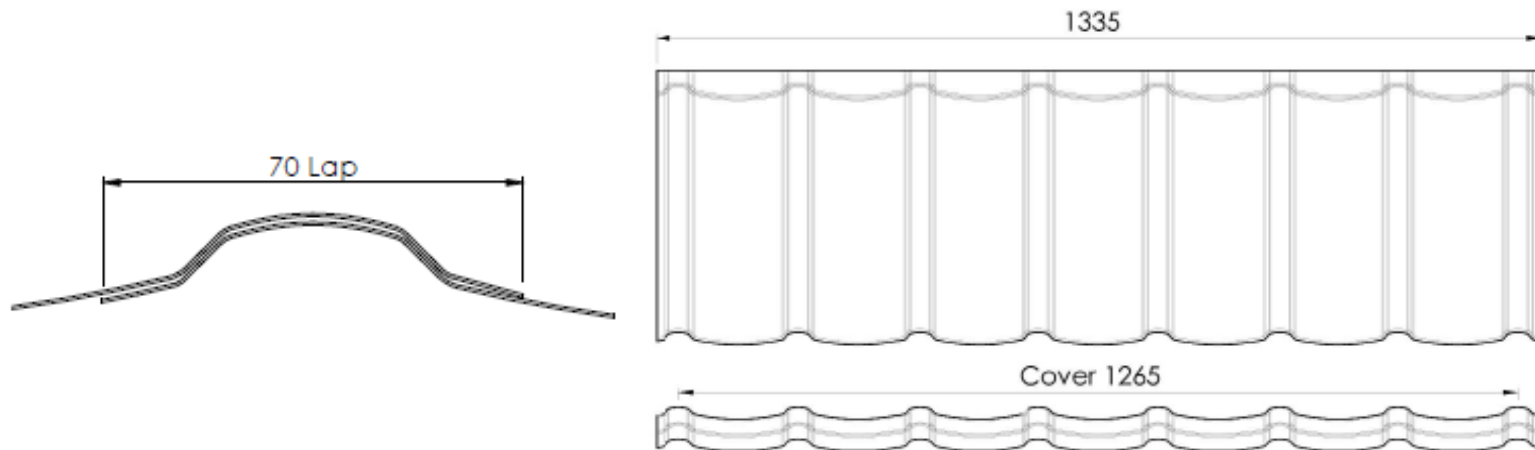
Figure 12.4 Side Lap Detail



Detail Sequence 9



* may be varied to suit rain water goods



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