



# ICC-ES Evaluation Report

## ESR-3098

Reissued February 2022

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This report is subject to renewal February 2024.

**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION**

**Section: 07 31 16—Metal Shingles**

**Section: 07 41 13—Metal Roof Panels**

**REPORT HOLDER:**

WESTLAKE ROYAL ROOFING LLC

**EVALUATION SUBJECT:**

**UNIFIED STEEL STONE COATED ROOFING BRAND PROFILES: PINE-CREST SHAKE, PACIFIC TILE, COTTAGE SHINGLE AND BARREL-VAULT COATED STEEL ROOFING PANELS: DIRECT-TO-DECK**

**1.0 EVALUATION SCOPE**

**1.1 Compliance with the following codes:**

- 2021, 2018, 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 2021, 2018, 2015, 2012, 2009 and 2006 *International Residential Code*® (IRC)

**Properties evaluated:**

- Weather resistance
- Wind uplift resistance
- Fire Classification

**1.2 Evaluation to the following green code:**

2019 California Green Building Standards Code (CALGreen), Title 24, Part 11

**Attributes verified:**

See Section 3.1

**2.0 USES**

The PINE-CREST Shake, PACIFIC Tile, COTTAGE Shingle and BARREL-VAULT roofing panels described in this report are recognized for use as Class A roof coverings on new and over existing roofs, when installed in accordance with Section 4.3 of this report.

**3.0 DESCRIPTION**

**3.1 General:**

The roofing panels are formed from sheet steel complying with ASTM A792, Grade 33, with an AZ 50 class,

hot-dipped aluminum–zinc alloy coating. The coated metal thickness is 0.017 inch (0.43 mm). On the exposed surface, colored stone granules are embedded in an acrylic resin base coating, followed by an application of a clear acrylic glaze. The installed weight of the steel roofing panels is 1.3 psf (6.3 kg/m<sup>2</sup>). See Figure 1 for panel profiles.

Various accessory elements are provided for ridges, gables and trims.

The attributes of the steel roofing panels have been verified as conforming to the provisions of CALGreen Section A5.406.1.2 for reduced maintenance. Note that decisions on compliance for those areas rest with the user of this report. The user is advised of the project-specific provisions that may be contingent upon meeting specific conditions, and the verification of those conditions is outside the scope of this report. The code may provide supplemental information as guidance.

**3.1.1 PINE-CREST Shake, and PACIFIC Tile:** The panels are 16 inches wide by 52 inches long (406 mm by 1320 mm), and have an installed exposure of 14½ inches by 50 inches (368 mm by 1270 mm). The leading edge of each panel is turned down approximately 1 inch (25 mm), and the back edge of the panels is bent up and horizontally back 1½ inches (38 mm) to create an overlapping edge for weather protection. Panel side laps are 2 inches (51 mm). The panels are formed with a series of stamped modules to simulate different tile profiles or the look of aged wood shakes.

**3.1.2 COTTAGE Shingle:** The panel is 15½ inches wide by 51 inches long (394 mm by 1296 mm), and has an installed exposure of 14¼ inches by 47½ inches (362 mm by 1207 mm). The leading edge of each panel is turned down approximately 1 inch (25 mm), and the back edge of the panel is bent up and horizontally back 1½ inches (38 mm) to create an overlapping edge for weather protection. Panel side laps are 3 inches (76 mm). The panels are formed with impressions to simulate a series of aged wood shingles.

**3.1.3 BARREL-VAULT:** The panel is 45.13 inches (1114 mm) wide by 15.58 inches (396 mm) deep, and weight 5.31 pounds (2.41 kg). The leading edge of each panel is turned down approximately 1 inch (25 mm), and the back edge of the panel is bent up and horizontally back 1½ inches (38 mm) to create an overlapping edge for

weather protection. Panel side laps are 2 inches (51 mm). The panels are formed with a series of stamped modules to simulate a series of S-shaped tiles.

### 3.2 Underlayment:

Underlayment must comply with, and be installed in accordance with, 2021 and 2018 IBC Sections 1507.1.1 and 1507.5.3, 2015, 2012, 2009 and 2006 IBC Section 1507.5.3, 2021, 2018 and 2015 IRC Sections R905.1.1 and R905.4.3 or 2012, 2009 or 2006 IRC Section R905.4.3, as applicable. For fire-classified roof coverings, one layer of GAF VersaShield® Fire-Resistant Roof Deck Protection must be installed in accordance with Section 4.3.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

The panels must be installed in accordance with this report, the applicable code and the manufacturer's published installation instructions. The manufacturer's installation instructions must be available at the jobsite at all times during installation.

The panels must be installed on roofs with minimum slopes of 3:12 (25-percent slope). For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval. Valley flashings must comply with 2021, 2018, 2015, 2012, or 2009 IBC Section 1507.5.7, 2006 IBC Section 1507.5.6 or IRC Section R905.4.6, as applicable. All other flashings must be in accordance with IBC Section 1503.2 or IRC Section R903.2.

### 4.2 New Construction:

**4.2.1 PINE-CREST Shake, COTTAGE Shingle, Pacific Tile, and BARREL-VAULT:** The panels must be installed directly on solid or closely fitted minimum  $1\frac{5}{32}$ -inch-thick (11.9 mm) plywood, on solid or closely fitted wood structural panel sheathing or on spaced structural sheathing boards complying with the applicable code. Additional structural sheathing boards must be attached to the roof framing as required to accommodate all panel fastening locations.

To attach the first course of panels at the eave using wood battens, the battens must be fastened through the sheathing to the supporting members spaced at a maximum of 24 inches on center (610 mm), with minimum 16d, corrosion-resistant, common wire ring shank nails of sufficient length to penetrate the framing at least  $\frac{3}{4}$  inch (19.1 mm). Battens are nominally 2-by-2 or 1-by-4 standard grade Douglas fir–larch or better. In lieu of using wood battens for the first course of panels, a starter metal flashing with a formed raised rib may be fastened through the sheathing to the supporting members spaced at a maximum of 24 inches on center (610 mm), with minimum 0.120-inch-diameter (3 mm), ring shank, corrosion-resistant common wire nails of sufficient length to penetrate the framing at least  $\frac{3}{4}$  inch (19.1 mm). Panels placed at the first course are attached through the front downturn to the starter batten at each lap and at evenly spaced intermediate points, with a number and size of corrosion-resistant ring shank nails as indicated in Table 6. The rear section of the Tile or Shake panels is attached at the first and subsequent courses to the sheathing at each lap and at evenly spaced intermediate points, with a number and size of corrosion-resistant ring shank nails as indicated in Table 6. After the first course of panels, subsequent courses of panels are also attached through the front downturn of the panels to the sheathing at each lap and at evenly spaced intermediate points, with a number and size of corrosion-resistant ring shank nails as

indicated in Table 6. No. 8 or No. 10, corrosion-resistant self-tapping screws may be substituted for wire nails to attach the panels, when installation is in accordance with Table 6.

### 4.3 Fire Classification:

The roofing panels described in this report, when installed in accordance with Sections 4.1 and 4.2 with one layer of GAF VersaShield® Fire-Resistant Roof Deck Protection installed in accordance with [ESR-2053](#), are recognized as Class A roof assemblies in accordance with IBC Section 1505.1 and IRC Section R902.1.

### 4.4 Wind Resistance:

Tables 1 through 5 provide the minimum required design uplift pressure based on ASCE 7 for a roofing panel installed on a low-rise building with a mean roof height of 30 feet (9.14 m) or less. If the building does not meet the criteria in Tables 1 through 5, or is constructed on an isolated hill, ridge, or escarpment constituting an abrupt change in the general topography ( $K_{zt} > 1.00$ ), or is in Exposure D, the minimum required design uplift pressure must be determined according to the IBC.

Table 1 is applicable to installations over solid sheathing, closely fitted decks and spaced sheathing under the 2021 and 2018 IBC and IRC. Tables 2 and 3 are applicable to installation over solid sheathing, closely fitted decks and spaced sheathing under the 2015 IBC, 2015 IRC and 2012 IBC with required design uplift pressures based on allowable stress design (ASD) and ultimate design wind speeds. Tables 4 and 5 are applicable to installations over solid sheathing and closely fitted decks under the 2009 and 2006 IBC and the 2012, 2009 and 2006 IRC with required design uplift pressures based on allowable stress design (ASD) and basic wind speeds (3-second gust). For installations over spaced sheathing under the 2021 and 2018 IBC and the 2021 and 2018 IRC, the required design uplift pressures must be calculated in accordance with ASCE 7-16. For installations over spaced sheathing under the 2015 and 2012 IBC and the 2015 IRC, the required design uplift pressures must be calculated in accordance with ASCE 7-10. For installations over spaced sheathing under the 2009 and 2006 IBC and the 2012, 2009 and 2006 IRC, the required design uplift pressures must be calculated in accordance with ASCE 7-05.

Table 6 indicates the maximum allowable wind uplift pressures for the roofing panels when installed in accordance with Sections 4.1 and 4.2. For use under conditions meeting the criteria in Tables 1 through 5, the maximum allowable wind uplift pressure in Table 6 must be equal to or greater than the minimum required design uplift pressure in Tables 1 through 5. Table 6 is applicable to the 2021, 2018, 2015, 2012, 2009 and 2006 IBC and the 2021, 2018, 2015, 2012, 2009 and 2006 IRC.

### 4.5 Live Loads:

The PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile, and BARREL-VAULT roofing panels have an allowable load of 28 psf (137 kg/m<sup>2</sup>) when applied to 1-inch-by-4-inch, minimum utility grade spruce-pine-fir spaced sheathing at 14 $\frac{1}{2}$  inches (369 mm) on center.

### 4.6 Reroofing:

With the old roof covering completely removed, all installation conditions noted in Sections 4.1 and 4.2 apply. The panels may also be installed over existing asphalt shingle or built-up roofing, subject to the conditions set forth here, provided the roof slope complies with Section 4.1 and the requirements of 2021 IBC Section 1512, 2018 and 2015 IBC Section 1511, 2012, 2009 or 2006 IBC Section 1510, 2021, 2018 and 2015 IRC Section R908 or

2012, 2009 or 2006 IRC Section R907 are met. The panels must be fastened through the existing roof to the roof sheathing in the same manner as detailed in Sections 4.2.1 and 4.2.2, with fasteners of sufficient length to penetrate the sheathing a minimum of  $\frac{3}{4}$  inch (19.1 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. See Section 4.3 for fire classification.

## 5.0 CONDITIONS OF USE

The roofing panels described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 The panels are manufactured, identified and installed in accordance with this report, the applicable code and the manufacturer's published installation instructions. In the event of a conflict between this report and the manufacturer's installation instructions, this report governs.
- 5.2 The steel roofing panels installed on spaced sheathing must not be used in applications subject to the 300-pound (1.3 kN) concentrated load specified in 2021 IBC Sections 1607.4 and 1607.13 and Table 1607.1, Item 27, 2018, 2015 and 2012 IBC Sections 1607.4 and 1607.12 and Table 1607.1, Item 26 [2009 IBC Sections 1607.4 and 1607.11 and 2009 IBC Table 1607.1, Item 29; 2006 IBC Sections 1607.4 and 1607.11 and 2006 Table 1607.1, Item 30].

- 5.3 The panels are manufactured in Oceanside, California under a quality-control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Metal Roof Coverings (AC166), dated February 2021.

## 7.0 IDENTIFICATION

- 7.1 A tag bearing the name and address of the manufacturer (Westlake Royal Roofing LLC), brand name (Unified Steel Stone Coated Roofing), the product name, production date code and the evaluation report number (ESR-3098) is affixed to each pallet.
- 7.2 The report holder's contact information is the following:

**WESTLAKE ROYAL ROOFING LLC**  
**7575 IRVINE CENTER DRIVE, SUITE 100**  
**IRVINE, CALIFORNIA 92618**  
**(801) 380-6091**  
[www.WestlakeRoyalRoofing.com](http://www.WestlakeRoyalRoofing.com)

**TABLE 1<sup>1,2,3,4</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B 2021 and 2018 IBC and IRC**

Gable Roofs in Exposure B										
7° < θ ≤ 20° ~ (Slope 3:12 – 4.4:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	18	21	25	30	35	40	45	51	57
	25	19	23	28	32	37	43	49	55	62
	30	20	24	29	34	39	45	51	58	65
	40	22	26	31	37	42	49	55	63	70
	50	23	28	33	39	45	52	59	67	75
	60	24	29	35	41	47	54	62	70	78
2	20	26	31	37	44	51	58	66	74	83
	25	28	34	40	47	55	63	71	80	90
	30	29	35	42	49	57	65	74	84	94
	40	32	38	45	53	62	71	81	91	102
	50	34	41	48	57	66	76	86	97	109
	60	35	43	51	60	69	79	90	102	114
3	20	31	37	44	52	60	69	78	88	99
	25	33	40	48	56	65	74	85	96	107
	30	35	42	50	58	68	78	88	100	112
	40	38	45	54	63	74	84	96	108	122
	50	40	48	58	68	78	90	102	116	NA
	60	42	51	60	71	82	94	107	121	NA
20° < θ ≤ 27° ~ (Slope 4.4:12 – 6.1:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	14	17	20	23	27	31	35	39	44
	25	15	18	21	25	29	33	38	43	48
	30	15	19	22	26	30	35	39	44	50
	40	17	20	24	28	33	38	43	48	54
	50	18	22	26	30	35	40	46	51	58
	60	19	23	27	32	37	42	48	54	60
2	20	22	26	31	37	43	49	56	63	70
	25	23	28	34	40	46	53	60	68	76
	30	25	30	35	41	48	55	63	71	79
	40	27	32	38	45	52	60	68	77	86
	50	28	34	41	48	56	64	73	82	92
	60	30	36	43	50	58	67	76	86	96
3	20	31	37	44	52	60	69	78	88	99
	25	33	40	48	56	65	74	85	96	107
	30	35	42	50	58	68	78	88	100	112
	40	38	45	54	63	74	84	96	108	122
	50	40	48	58	68	78	90	102	116	NA
	60	42	51	60	71	82	94	107	121	NA
Gable Roofs in Exposure B (continued)										
27° < θ ≤ 45° ~ (Slope 6.1:12 – 12:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	16	19	23	27	31	36	41	46	52
	25	17	21	25	29	34	39	44	50	56
	30	18	22	26	31	36	41	46	52	59
	40	20	24	28	33	39	44	50	57	64
	50	21	25	30	35	41	47	54	61	68
	60	22	27	32	37	43	49	56	64	71
2	20	18	21	25	30	35	40	45	51	57
	25	19	23	28	32	37	43	49	55	62
	30	20	24	29	34	39	45	51	58	65
	40	22	26	31	37	42	49	55	63	70
	50	23	28	33	39	45	52	59	67	75
	60	24	29	35	41	47	54	62	70	78
3	20	27	33	39	46	54	62	70	79	89
	25	30	36	43	50	58	67	76	86	96
	30	31	37	45	52	61	70	79	89	100
	40	34	41	48	57	66	76	86	97	109
	50	36	43	52	60	70	80	92	103	116
	60	38	45	54	63	74	84	96	108	122

(Continued)

**TABLE 1<sup>1,2,3,4</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B 2021 and 2018 IBC and IRC**

Gable Roofs in Exposure C										
7° < θ ≤ 20° ~ (Slope 3:12 – 4.4:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	26	31	37	43	50	58	66	74	83
	25	27	32	39	45	52	60	69	77	87
	30	28	34	40	47	55	63	71	81	90
	40	30	36	43	50	58	67	76	86	96
	50	31	38	45	52	61	70	79	90	101
	60	32	39	46	54	63	72	82	93	104
2	20	37	45	54	63	73	84	96	108	121
	25	39	47	56	66	77	88	100	113	127
	30	41	49	59	69	80	92	104	118	NA
	40	43	52	62	73	85	97	111	125	NA
	50	45	55	65	77	89	102	116	NA	NA
	60	47	57	68	79	92	106	120	NA	NA
3	20	44	54	64	75	87	100	114	128	NA
	25	46	56	67	78	91	104	119	NA	NA
	30	48	59	70	82	95	109	124	NA	NA
	40	51	62	74	87	101	116	NA	NA	NA
	50	54	65	78	91	105	121	NA	NA	NA
	60	56	68	80	94	109	126	NA	NA	NA

Gable Roofs in Exposure C (continued)										
20° < θ ≤ 27° ~ (Slope 4.4:12 – 6.1:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	20	24	28	33	39	44	51	57	64
	25	21	25	30	35	40	46	53	60	67
	30	22	26	31	36	42	48	55	62	70
	40	23	28	33	39	45	51	58	66	74
	50	24	29	34	40	47	54	61	69	78
	60	25	30	36	42	49	56	64	72	80
2	20	32	38	45	53	62	71	81	91	102
	25	33	40	47	56	65	74	84	95	107
	30	34	42	49	58	67	77	88	99	111
	40	36	44	52	62	71	82	93	105	118
	50	38	46	55	65	75	86	98	110	124
	60	40	48	57	67	78	89	101	114	128
3	20	44	54	64	75	87	100	114	128	NA
	25	46	56	67	78	91	104	119	NA	NA
	30	48	59	70	82	95	109	124	NA	NA
	40	51	62	74	87	101	116	NA	NA	NA
	50	54	65	78	91	105	121	NA	NA	NA
	60	56	68	80	94	109	126	NA	NA	NA

20° < θ ≤ 45° ~ (Slope 6.1:12 – 12:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	23	28	34	39	46	52	60	67	75
	25	24	29	35	41	48	55	62	70	79
	30	25	31	37	43	50	57	65	73	82
	40	27	33	39	45	53	61	69	78	87
	50	28	34	41	48	55	63	72	81	91
	60	29	35	42	49	57	66	75	84	95
2	20	26	31	37	43	50	58	66	74	83
	25	27	32	39	45	52	60	69	77	87
	30	28	34	40	47	55	63	71	81	90
	40	30	36	43	50	58	67	76	86	96
	50	31	38	45	52	61	70	79	90	101
	60	32	39	46	54	63	72	82	93	104
3	20	40	48	57	67	78	89	102	115	NA
	25	42	50	60	70	81	93	106	120	NA
	30	43	52	62	73	85	97	111	125	NA
	40	46	56	66	78	90	103	118	NA	NA
	50	48	58	69	81	94	108	123	NA	NA
	60	50	60	72	84	98	112	128	NA	NA

(Continued)

**TABLE 1<sup>1,2,3,4</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B 2021 and 2018 IBC and IRC**

Hip Roofs in Exposure B										
7° < θ ≤ 20° ~ (Slope 3:12 – 4.4:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	16	19	23	27	31	36	41	46	52
	25	17	21	25	29	34	39	44	50	56
	30	18	22	26	31	36	41	46	52	59
	40	20	24	28	33	39	44	50	57	64
	50	21	25	30	35	41	47	54	61	68
	60	22	27	32	37	43	49	56	64	71
2	20	23	27	32	38	44	51	58	65	73
	25	24	29	35	41	48	55	62	70	79
	30	25	31	37	43	50	57	65	73	82
	40	28	33	40	47	54	62	71	80	89
	50	29	36	42	50	58	66	75	85	95
	60	31	37	44	52	61	69	79	89	100
3	20	23	27	32	38	44	51	58	65	73
	25	24	29	35	41	48	55	62	70	79
	30	25	31	37	43	50	57	65	73	82
	40	28	33	40	47	54	62	71	80	89
	50	29	36	42	50	58	66	75	85	95
	60	31	37	44	52	61	69	79	89	100
20° < θ ≤ 27° ~ (Slope 4.4:12 – 6.1:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	13	16	18	22	25	29	33	37	41
	25	14	17	20	23	27	31	35	40	45
	30	14	18	21	24	28	33	37	42	47
	40	16	19	23	27	31	35	40	45	51
	50	17	20	24	28	33	38	43	48	54
	60	18	21	25	30	34	40	45	51	57
2	20	18	21	25	30	35	40	45	51	57
	25	19	23	28	32	37	43	49	55	62
	30	20	24	29	34	39	45	51	58	65
	40	22	26	31	37	42	49	55	63	70
	50	23	28	33	39	45	52	59	67	75
	60	24	29	35	41	47	54	62	70	78
3	20	18	21	25	30	35	40	45	51	57
	25	19	23	28	32	37	43	49	55	62
	30	20	24	29	34	39	45	51	58	65
	40	22	26	31	37	42	49	55	63	70
	50	23	28	33	39	45	52	59	67	75
	60	24	29	35	41	47	54	62	70	78
Hip Roofs in Exposure B (continued)										
20° < θ ≤ 45° ~ (Slope 6.1:12 – 12:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	14	17	20	23	27	31	35	39	44
	25	15	18	21	25	29	33	38	43	48
	30	15	19	22	26	30	35	39	44	50
	40	17	20	24	28	33	38	43	48	54
	50	18	22	26	30	35	40	46	51	58
	60	19	23	27	32	37	42	48	54	60
2	20	24	29	35	41	47	54	62	70	78
	25	26	32	38	44	51	59	67	75	85
	30	27	33	39	46	53	61	70	79	88
	40	30	36	43	50	58	67	76	86	96
	50	32	38	45	53	62	71	81	91	102
	60	33	40	48	56	65	74	85	96	107
3	20	31	37	44	52	60	69	78	88	99
	25	33	40	48	56	65	74	85	96	107
	30	35	42	50	58	68	78	88	100	112
	40	38	45	54	63	74	84	96	108	122
	50	40	48	58	68	78	90	102	116	NA
	60	42	51	60	71	82	94	107	121	NA

(Continued)



**TABLE 1<sup>1,2,3,4</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B 2021 and 2018 IBC and IRC**

Hip Roofs in Exposure C										
7° < θ ≤ 20° ~ (Slope 3:12 – 4.4:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	23	28	34	39	46	52	60	67	75
	25	24	29	35	41	48	55	62	70	79
	30	25	31	37	43	50	57	65	73	82
	40	27	33	39	45	53	61	69	78	87
	50	28	34	41	48	55	63	72	81	91
	60	29	35	42	49	57	66	75	84	95
2	20	33	40	47	55	64	74	84	94	106
	25	34	41	49	58	67	77	87	99	111
	30	36	43	51	60	70	80	91	103	115
	40	38	46	54	64	74	85	97	109	122
	50	40	48	57	67	78	89	101	114	128
	60	41	50	59	69	80	92	105	119	133
3	20	33	40	47	55	64	74	84	94	106
	25	34	41	49	58	67	77	87	99	111
	30	36	43	51	60	70	80	91	103	115
	40	38	46	54	64	74	85	97	109	122
	50	40	48	57	67	78	89	101	114	128
	60	41	50	59	69	80	92	105	119	NA

Hip Roofs in Exposure C (continued)										
20° < θ ≤ 27° ~ (Slope 4.4:12 – 6.1:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	19	23	27	31	36	42	48	54	60
	25	19	24	28	33	38	44	50	56	63
	30	20	25	29	34	40	46	52	58	66
	40	22	26	31	36	42	48	55	62	70
	50	23	27	32	38	44	51	58	65	73
	60	23	28	34	39	46	53	60	67	76
2	20	26	31	37	43	50	58	66	74	83
	25	27	32	39	45	52	60	69	77	87
	30	28	34	40	47	55	63	71	81	90
	40	30	36	43	50	58	67	76	86	96
	50	31	38	45	52	61	70	79	90	101
	60	32	39	46	54	63	72	82	93	104
3	20	26	31	37	43	50	58	66	74	83
	25	27	32	39	45	52	60	69	77	87
	30	28	34	40	47	55	63	71	81	90
	40	30	36	43	50	58	67	76	86	96
	50	31	38	45	52	61	70	79	90	101
	60	32	39	46	54	63	72	82	93	104

20° < θ ≤ 45° ~ (Slope 6.1:12 – 12:12)										
Zone	Mean Roof Height (ft)	Basic Wind Speed (mph)								
		100	110	120	130	140	150	160	170	180
1	20	20	24	28	33	39	44	51	57	64
	25	21	25	30	35	40	46	53	60	67
	30	22	26	31	36	42	48	55	62	70
	40	23	28	33	39	45	51	58	66	74
	50	24	29	34	40	47	54	61	69	78
	60	25	30	36	42	49	56	64	72	80
2	20	35	42	50	59	69	79	90	101	114
	25	37	44	53	62	72	82	94	106	119
	30	38	46	55	64	75	86	98	110	124
	40	41	49	58	68	79	91	104	117	NA
	50	42	51	61	72	83	95	109	123	NA
	60	44	53	63	74	86	99	113	127	NA
3	20	44	54	64	75	87	100	114	128	NA
	25	46	56	67	78	91	104	119	NA	NA
	30	48	59	70	82	95	109	124	NA	NA
	40	51	62	74	87	101	116	NA	NA	NA
	50	54	65	78	91	105	121	NA	NA	NA
	60	56	68	80	94	109	126	NA	NA	NA

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m<sup>2</sup>; 1 mph = 0.44m/s.

<sup>1</sup>Table is based on ASCE 7-16. The required design uplift pressures apply to installations over solid sheathing, closely fitted decks and spaced sheathing.

<sup>2</sup>Topographic factor,  $K_{zt} = 1.00$ . To address the wind speed-up effect due to the topographic effect, either (1) Calculate the required design uplift pressure using ASCE 7-16, or; (2) Multiply the design pressure in Table by  $K_{zt}$  for the building site.

<sup>3</sup>See ASCE-7-16, Figures 30.3-2B, 30.3-2D, and 30.3-5B for roof zones.

<sup>4</sup>For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval.



**TABLE 2<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B**

2015 IBC, 2015 IRC and 2012 IBC

Required Design Uplift Pressure (psf) ASCE 7-10 Category II Building Exposure B Solid Sheathing or Spaced Sheathing											
Vult (mph)	110	115	120	130	140	150	160	165	170	180	195
Roof Style	Gable/Hip										
Roof Slope	7° < θ ≤ 27° ~ (3:12 to 6:12)										
Height (ft)	Roof Zone 1										
0-30	16	18	19	22	26	30	34	36	38	43	50
40	17	19	21	24	28	32	37	39	42	47	55
50	19	20	22	26	30	35	39	42	44	50	58
60	19	21	23	27	32	36	41	44	47	52	61
Height (ft)	Roof Zone 3										
0-30	35	38	41	49	56	65	74	78	83	93	109
40	38	41	45	53	61	70	80	85	90	101	119
50	40	44	48	56	65	75	85	91	96	108	127
60	42	46	50	59	69	79	89	95	101	113	NA
Roof Style	Hip										
Roof Slope	7° < θ ≤ 25° ~ (3:12 to 5½:12)										
Height (ft)	Roof Zone 1										
0-30	16	18	19	22	26	30	34	36	38	43	50
40	17	19	21	24	28	32	37	39	42	47	55
50	19	20	22	26	30	35	39	42	44	50	58
60	19	21	23	27	32	36	41	44	47	52	61
Height (ft)	Roof Zone 3										
0-30	25	27	30	35	40	46	53	56	59	67	78
40	27	30	32	38	44	50	57	61	65	72	85
50	29	31	34	40	47	54	61	65	69	77	90
60	30	33	36	42	49	56	64	68	72	81	95
Roof Style	Gable										
Roof Slope	27° < θ ≤ 45° ~ (6:12 to 12:12)										
Height (ft)	Roof Zone 1										
0-30	17	19	20	24	28	32	36	39	41	46	54
40	19	20	22	26	30	35	39	42	44	50	58
50	20	22	24	28	32	37	42	45	47	53	62
60	21	23	25	29	34	39	44	47	50	56	65

(CONTINUED)

**TABLE 2<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B (CONTINUED)  
2015 IBC, 2015 IRC and 2012 IBC**

Height (ft)	Roof Zone 3										
0-30	19	21	23	27	31	36	41	44	46	52	61
40	21	23	25	29	34	39	44	47	50	56	66
50	22	24	27	31	36	42	47	50	53	60	70
60	23	26	28	33	38	44	50	53	56	63	74
Roof Style	Monoslope										
Roof Slope	10° < θ ≤ 30° ~ (3:12 to 7:12)										
Height (ft)	Roof Zone 1										
0-30	20	22	24	29	33	38	43	46	49	55	64
40	22	24	26	31	36	41	47	50	53	59	70
50	24	26	28	33	38	44	50	53	57	63	74
60	25	27	30	35	40	46	53	56	59	67	78
Height (ft)	Roof Zone 3										
0-30	38	42	45	53	62	71	81	86	91	102	120
40	41	45	49	58	67	77	88	93	99	111	NA
50	44	48	53	62	72	82	93	99	105	118	NA
60	46	51	55	65	75	86	98	104	111	124	NA

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m<sup>2</sup>; 1 mph = 0.44m/s.

<sup>1</sup>Table is based on ASCE 7-10. The required design uplift pressures apply to installations over solid sheathing, closely fitted decks and spaced sheathing.

<sup>2</sup>Topographic factor, K<sub>zt</sub> = 1.00. To address the wind speed-up effect due to the topographic effect, either

(1) Calculate the required design uplift pressure using ASCE 7-10, or; (2) Multiply the design pressure in Table by K<sub>zt</sub> for the building site.

<sup>3</sup>See ASCE-7-10, Figures 30.4-2B, 30.4-2C, and 30.4-5B for roof zones.

<sup>4</sup>For a hip roof with a slope 25° < θ ≤ 27°, use the design wind uplift pressure for Gable/Hip Roof 7° < θ ≤ 27° for Zones 2 & 3.

<sup>5</sup>For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval.

**TABLE 3<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE C**

2015 IBC, 2015 IRC and 2012 IBC

Required Design Uplift Pressure (psf) ASCE 7-10 Category II Building Exposure C Solid Sheathing or Spaced Sheathing											
Vult (mph)	110	115	120	130	140	150	160	165	170	180	195
<b>Roof Style</b>	<b>Gable/Hip</b>										
<b>Roof Slope</b>	<b>7° &lt; θ ≤ 27° ~ (1½:12 to 6:12)</b>										
<b>Height (ft)</b>	<b>Roof Zone 1</b>										
0-15	19	21	23	27	32	36	41	44	47	52	61
20	21	23	25	29	33	38	44	46	49	55	65
25	22	24	26	30	35	40	46	48	51	58	68
30	22	25	27	31	36	42	47	51	54	60	71
40	24	26	28	33	39	44	50	54	57	64	75
50	25	27	30	35	40	46	53	56	60	67	78
60	26	28	31	36	42	48	55	58	62	69	81
<b>Height (ft)</b>	<b>Roof Zone 3</b>										
0-15	42	46	50	59	69	79	89	95	101	113	NA
20	45	49	53	63	73	83	95	101	107	120	NA
25	47	51	56	65	76	87	99	105	112	125	NA
30	49	53	58	68	79	91	103	110	116	NA	NA
40	52	57	62	72	84	96	109	116	124	NA	NA
50	54	59	65	76	88	101	115	122	NA	NA	NA
60	56	61	67	79	91	105	119	127	NA	NA	NA
<b>Roof Style</b>	<b>Hip</b>										
<b>Roof Slope</b>	<b>7° &lt; θ ≤ 25° ~ (1½:12 to 5½:12)</b>										
<b>Height (ft)</b>	<b>Roof Zone 1</b>										
0-15	19	21	23	27	32	36	41	44	47	52	61
20	21	23	25	29	33	38	44	46	49	55	65
25	22	24	26	30	35	40	46	48	51	58	68
30	22	25	27	31	36	42	47	51	54	60	71
40	24	26	28	33	39	44	50	54	57	64	75
50	25	27	30	35	40	46	53	56	60	67	78
60	26	28	31	36	42	48	55	58	62	69	81
<b>Height (ft)</b>	<b>Roof Zone 3</b>										
0-15	30	33	36	42	49	56	64	68	72	81	95
20	32	35	38	45	52	59	68	72	76	86	101
25	33	37	40	47	54	62	71	75	80	89	105
30	35	38	41	49	56	65	74	78	83	93	109
40	37	40	44	52	60	69	78	83	88	99	116
50	39	42	46	54	63	72	82	87	93	104	122
60	40	44	48	56	65	75	85	90	96	108	126
<b>Roof Style</b>	<b>Gable</b>										
<b>Roof Slope</b>	<b>27° &lt; θ ≤ 45° ~ (6:12 to 12:12)</b>										
<b>Height (ft)</b>	<b>Roof Zone 1</b>										
0-15	21	23	25	29	34	39	44	47	50	56	65
20	22	24	26	31	36	41	47	50	53	59	69
25	23	25	27	32	37	43	49	52	55	62	72
30	24	26	29	34	39	45	51	54	57	64	75
40	25	28	30	36	41	47	54	57	61	68	80
50	27	29	32	37	43	50	56	60	64	71	84
60	28	30	33	39	45	51	59	62	66	74	87
<b>Height (ft)</b>	<b>Roof Zone 3</b>										
0-15	23	26	28	33	38	44	50	53	56	63	74
20	25	27	30	35	40	46	53	56	59	67	78
25	26	28	31	36	42	48	55	58	62	70	82
30	27	30	32	38	44	50	57	61	65	73	85
40	29	31	34	40	47	53	61	65	69	77	90
50	30	33	36	42	49	56	64	68	72	81	95
60	31	34	37	44	51	58	66	70	75	84	98
<b>Roof Style</b>	<b>Monoslope</b>										
<b>Roof Slope</b>	<b>10° &lt; θ ≤ 30° ~ (2¼:12 to 7:12)</b>										

(CONTINUED)

**TABLE 3<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE C (CONTINUED)  
2015 IBC, 2015 IRC and 2012 IBC**

Height (ft)	Roof Zone 1										
	0-15	25	27	30	35	40	46	53	56	59	67
20	26	29	31	37	43	49	56	59	63	70	83
25	27	30	33	38	45	51	58	62	66	74	86
30	29	31	34	40	46	53	61	64	68	77	90
40	30	33	36	42	49	57	64	68	73	81	96
50	32	35	38	44	52	59	67	72	76	85	100
60	33	36	39	46	53	61	70	74	79	88	104
Height (ft)	Roof Zone 3										
	0-15	46	51	55	65	75	86	98	104	111	124
20	49	54	58	69	79	91	104	110	117	NA	NA
25	51	56	61	72	83	95	108	115	122	NA	NA
30	53	58	64	75	87	99	113	120	128	NA	NA
40	57	62	67	79	92	105	120	128	NA	NA	NA
50	59	65	71	83	96	110	126	NA	NA	NA	NA
60	62	67	73	86	100	115	NA	NA	NA	NA	NA

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m<sup>2</sup>; 1 mph = 0.44m/s.

<sup>1</sup>Table is based on ASCE 7-10. The required design uplift pressures apply to installations over solid sheathing, closely fitted decks and spaced sheathing.

<sup>2</sup>Topographic factor,  $K_{zt} = 1.00$ . To address the wind speed-up effect due to the topographic effect, either (1) Calculate the required design uplift pressure using ASCE 7-10, or; (2) Multiply the design pressure in Table by  $K_{zt}$  for the building site.

<sup>3</sup>See ASCE-7-10, Figures 30.4-2B, 30.4-2C, and 30.4-5B for roof zones.

<sup>4</sup>For a hip roof with a slope  $25^\circ < \theta \leq 27^\circ$ , use the design wind uplift pressure for Gable/Hip Roof  $7^\circ < \theta \leq 27^\circ$  for Zones 2 & 3.

<sup>5</sup>For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval.

**TABLE 4<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE B**

**2009 and 2006 IBC; 2012, 2009 and 2006 IRC**

MEAN ROOF HEIGHT (ft)	BASIC WIND SPEED, V (mph)							
	85		90		100		110	
	Roof Zones <sup>3</sup>							
	1	2 & 3	1	2 & 3	1	2 & 3	1	2 & 3
	GABLE / HIP ROOF 7° < θ ≤ 27° (≈1½:12 < θ ≤ ≈6:12°) <sup>5</sup>							
	Importance Factor = 1.00							
0-30	11.0	28.6	12.3	32.1	15.2	39.6	18.4	47.9
	Importance Factor = 1.15							
0-30	12.6	32.9	14.2	36.9	17.5	45.5	21.2	55.1
	HIP ROOF <sup>4</sup> 7° < θ ≤ 25° (≈1½:12 < θ ≤ ≈6:12°) <sup>5</sup>							
	Importance Factor = 1.00							
0-30	11.0	18.7	12.3	21.0	15.2	25.9	18.4	31.3
	Importance Factor = 1.15							
0-30	12.6	21.5	14.2	24.1	17.5	29.8	21.2	36.0
	MONOSLOPE ROOF 10° < θ ≤ 30° (≈2¼:12 < θ ≤ ≈7:12°) <sup>5</sup>							
	Importance Factor = 1.00							
0-30	14.3	31.9	16.0	35.8	19.8	44.2	24.0	53.4
	Importance Factor = 1.15							
0-30	16.4	36.7	18.4	41.1	22.8	50.8	27.6	61.5

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m<sup>2</sup>; 1 mph = 0.44m/s.

<sup>1</sup>Table is based on ASCE 7-05. The required design uplift pressures apply to installations over solid sheathing or closely fitted decks. For required design uplift pressures applicable to installations over spaced sheathing under the 2009 and 2006 IBC and the 2012, 2009 and 2006 IRC, the required design uplift pressures must be calculated in accordance with ASCE 7-05.

<sup>2</sup>Topographic factor, K<sub>zt</sub> = 1.00. To address the wind speed-up effect due to the topographic effect, either (1) Calculate the required design pressure using ASCE 7-05, or; (2) Multiply the required design pressure in the Table by K<sub>zt</sub> for the building site.

<sup>3</sup>See Figure 6-3, ASCE-7-05, for Roof Zones.

<sup>4</sup>For a hip roof with a slope 25° < θ ≤ 27°, use the design uplift pressure for Gable/Hip Roof 7° < θ ≤ 27° for Zones 2 & 3.

<sup>5</sup>For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval.

**TABLE 5<sup>1,2</sup>—REQUIRED DESIGN UPLIFT PRESSURE, p (psf)  
EXPOSURE C**

2009 and 2006 IBC; 2012, 2009 and 2006 IRC

Mean Roof Height (ft)	BASIC WIND SPEED, V (mph)							
	85		90		100		110	
	Roof Zones <sup>3</sup>							
	1	2 & 3	1	2 & 3	1	2 & 3	1	2 & 3
<b>GABLE / HIP ROOF 7° &lt; θ ≤ 27°</b> (≈1½:12 < θ ≤ ≈6:12) <sup>5</sup>								
<b>Importance Factor = 1.00</b>								
0-15	13.4	34.7	15.0	39.0	18.5	48.1	22.4	58.2
20	14.1	36.8	15.9	41.2	19.6	50.9	23.7	61.6
25	14.8	38.4	16.6	43.1	20.4	53.2	24.7	64.3
30	15.4	40.0	17.3	44.9	21.3	55.4	25.8	67.1
<b>Importance Factor = 1.15</b>								
0-15	15.4	40.0	17.2	44.8	21.3	55.3	25.7	66.9
20	16.3	42.3	18.2	47.4	22.5	58.6	27.2	70.8
25	17.0	44.2	19.0	49.5	23.5	61.2	28.5	74.0
30	17.7	46.1	19.9	51.6	24.5	63.8	29.7	77.2
<b>HIP ROOF<sup>4</sup> 7° &lt; θ ≤ 25°</b> (≈1½:12 < θ ≤ ≈6:12) <sup>5</sup>								
<b>Importance Factor = 1.00</b>								
0-15	13.4	22.7	15.0	25.5	18.5	31.4	22.4	38.0
20	14.1	24.0	15.9	27.0	19.6	33.3	23.7	40.3
25	14.8	25.1	16.6	28.2	20.4	34.8	24.7	42.1
30	15.4	26.2	17.3	29.4	21.3	36.2	25.8	43.9
<b>Importance Factor = 1.15</b>								
0-15	15.4	26.1	17.2	29.3	21.3	36.2	25.7	43.8
20	16.3	27.7	18.2	31.0	22.5	38.3	27.2	46.3
25	17.0	28.9	19.0	32.4	23.5	40.0	28.5	48.4
30	17.7	30.1	19.9	33.8	24.5	41.7	29.7	50.4
<b>MONOSLOPE ROOF 10° &lt; θ ≤ 30°</b> (≈2¼:12 < θ ≤ ≈7:12) <sup>5</sup>								
<b>Importance Factor = 1.00</b>								
0-15	17.4	38.8	19.5	43.4	24.0	53.6	29.1	64.9
20	18.4	41.0	20.6	46.0	25.4	56.8	30.8	68.7
25	19.2	42.8	21.5	48.0	26.6	59.3	32.2	71.8
30	20.0	44.7	22.4	50.1	27.7	61.8	33.5	74.8
<b>Importance Factor = 1.15</b>								
0-15	20.0	44.6	22.4	50.0	27.6	61.7	33.4	74.6
20	21.2	47.2	23.7	52.9	29.3	65.3	35.4	79.0
25	22.1	49.3	24.8	55.2	30.6	68.2	37.0	82.5
30	23.0	51.4	25.8	57.6	31.9	71.1	38.6	86.0

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m<sup>2</sup>; 1 mph = 0.44m/s.

<sup>1</sup>Table is based on ASCE 7-05. The required design uplift pressures apply to installations over solid sheathing or closely fitted decks. For required design uplift pressures applicable to installations over spaced sheathing under the 2009 and 2006 IBC and the 2012, 2009 and 2006 IRC, the required design uplift pressures must be calculated in accordance with ASCE 7-05.

<sup>2</sup>Topographic factor, K<sub>zt</sub> = 1.00. To address the wind speed-up effect due to the topographic effect, either (1) Calculate the required design pressure using ASCE 7-05, or; (2) Multiply the required design pressure in the Table by K<sub>zt</sub> for the building site.

<sup>3</sup>See Figure 6-3, ASCE-7-05, for Roof Zones.

<sup>4</sup>For a hip roof with a slope 25° < θ ≤ 27°, use the design uplift pressure for Gable/Hip Roof 7° < θ ≤ 27° for Zones 2 & 3.

<sup>5</sup>For roof slopes less than 3:12 (25 percent slope), the panels are considered decorative and must be installed over a roof-covering system complying with the applicable code, subject to code official approval.

**TABLE 6—MAXIMUM ALLOWABLE WIND UPLIFT PRESSURES ON  
UNIFIED STEEL STONE COATED ROOFING BRAND PANELS**

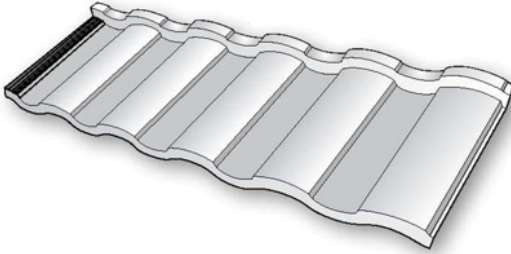
SYSTEM NO.	SUBSTRATE	ROOFING PANEL	PANEL FASTENING	ALLOWABLE WIND UPLIFT PRESSURE (psf)
1	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Five 8d x 2-inch-long, galvanized ring shank nails at front downturn of each panel, and five 8d x 2-inch-long, galvanized ring shank nails at backshelf per full panel width	48
2	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Six No. 10 x 2-inch-long screws at front downturn of each panel, and six No. 10 x 2-inch-long screws at backshelf per full panel width. Screws at backshelf to be fastened through sheathing to the rafters, the rest to be fastened through sheathing and evenly spaced between rafters	105
3	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Six No. 10 x 2-inch-long, screws at front downturn of each panel, and six No. 10 x 2-inch-long screws at backshelf per full panel width	124
4	1 x 4 spaced sheathing boards	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Six 8d x 2-inch-long, galvanized ring shank nails at front downturn of each panel, and six 8d x 2-inch-long, galvanized ring shank nails at backshelf per full panel width	50
5	1 x 4 spaced sheathing boards	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Eight No. 8 x 2-inch-long screws at front downturn of each panel, and eight No. 8 x 2-inch-long screws at backshelf per full panel width	85
6	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Four No. 10 x 2 $\frac{1}{4}$ -inch-long screws, equally spaced at front downturn of each panel	37
7	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Four No. 10-16 x 2-inch-long HWH wood screws spaced 13 inches o.c. through the vertical leg at the headlap beginning at the center of the side lap and four No. 10-16 x 2-inch-long HWH wood screws spaced 12 $\frac{3}{8}$ inches o.c. through the horizontal leg at the back of the panel beginning at the side lap	58
8	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Eight No. 10-16 x 2.5-inch-long HWH wood screws spaced 7.5 inches o.c. through the vertical leg at the headlap beginning at the center of the side lap and eight No. 10-16 x 2-inch-long HWH wood screws spaced 6 $\frac{1}{4}$ inches o.c. through the horizontal leg at the back of the panel beginning at the side lap	128
9	Minimum $1\frac{5}{32}$ -inch-thick plywood	PINE-CREST Shake, COTTAGE Shingle, PACIFIC Tile and BARREL-VAULT	Four No. 10-16 x 2.5-inch-long HWH wood screws spaced 13 inches o.c. through the vertical leg at the headlap beginning at the center of the side lap and four No. 10-16 x 2.5-inch-long HWH wood screws spaced 12 $\frac{3}{8}$ inches o.c. through the horizontal leg at the back of the panel beginning at the side lap	113

For SI: 1 inch = 25.4 mm; 1 psf = 4.88 kg/m<sup>2</sup>.

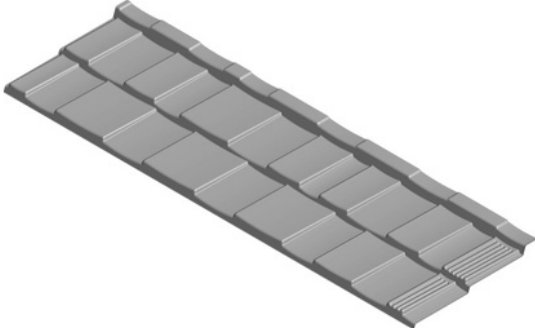




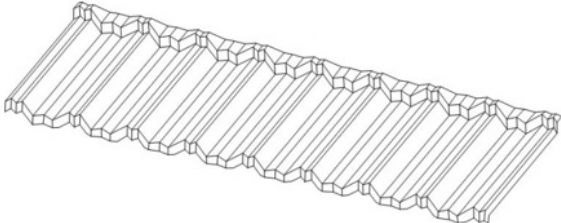
**PINE-CREST Shake**



**BARREL-VAULT Tile**

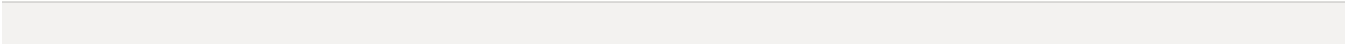


**COTTAGE Shingle**



**PACIFIC Tile**

**FIGURE 1—PANEL PROFILES**



**DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION****Section: 07 31 16—Metal Shingles****Section: 07 41 13—Metal Roof Panels****REPORT HOLDER:****WESTLAKE ROYAL ROOFING LLC****EVALUATION SUBJECT:****UNIFIED STEEL STONE COATED ROOFING BRAND PROFILES: PINE-CREST SHAKE, PACIFIC TILE, COTTAGE SHINGLE AND BARREL-VAULT COATED STEEL ROOFING PANELS: DIRECT-TO-DECK****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that PINE-CREST Shake, PACIFIC Tile, COTTAGE Shingle and BARREL-VAULT Coated Steel Roofing Panels: Direct-to-Deck, recognized in ICC-ES evaluation report ESR-3098, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2019 and 2016 *California Building Code (CBC)*

For evaluation of applicable chapters adopted by the California Office of Statewide Health Planning and Development (OSHPD) and Division of State Architect (DSA), see Sections 2.1.1 and 2.1.2 below.

- 2019 and 2016 *California Residential Code (CRC)*

**2.0 CONCLUSIONS****2.1 CBC:**

The PINE-CREST Shake, PACIFIC Tile, COTTAGE Shingle and BARREL-VAULT Coated Steel Roofing Panels: Direct-to-Deck described in the evaluation report ESR-3098 may be used where the CBC requires a Class A roof covering complying with CBC Section 1505.1.1, a Class B roof covering complying with CBC Section 1505.1.2, or a Class C roof covering complying with CBC Section 1505.1.3, provided installation is in accordance with the 2018 and 2015 *International Building Code*® (IBC) provisions, as applicable, noted in the evaluation report.

**2.1.1 OSHPD:**

The applicable OSHPD Sections of the CBC are beyond the scope of this supplement.

**2.1.2 DSA:**

The applicable DSA Sections of the CBC are beyond the scope of this supplement.

**2.2 CRC:**

The PINE-CREST Shake, PACIFIC Tile, COTTAGE Shingle and BARREL-VAULT Coated Steel Roofing Panels: Direct-to-Deck described in the evaluation report ESR-3098 may be used where the CRC requires a Class A roof covering complying with CRC Section R902.1.1, a Class B roof covering complying with CRC Section R902.1.2, or a Class C roof covering complying with CRC Section 902.1.3, provided installation is in accordance with the 2018 and 2015 *International Residential Code*® (IRC) provisions, as applicable, noted in the evaluation report.

This supplement expires concurrently with the evaluation report, reissued February 2022 and revised April 2022.