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ESR-3098

Reissued 02/2017
This report is subject to renewal 02/2019.

DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

SECTION: 07 31 16—METAL SHINGLES

SECTION: 07 41 13—METAL ROOF PANELS

REPORT HOLDER:

METRO ROOF PRODUCTS

**3093 INDUSTRY STREET
OCEANSIDE, CALIFORNIA 92054**

EVALUATION SUBJECT:

**METRO, STEELROCK AND PROSTEEL COATED STEEL ROOFING PANELS:
DIRECT-TO-DECK**



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ICC-ES Evaluation Report

ESR-3098

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DIVISION: 07 00 00—THERMAL AND MOISTURE PROTECTION

Section: 07 31 16—Metal Shingles

Section: 07 41 13—Metal Roof Panels

REPORT HOLDER:

METRO ROOF PRODUCTS

3093 INDUSTRY STREET

OCEANSIDE, CALIFORNIA 92054

(760) 435-9842

www.smartroofs.com

EVALUATION SUBJECT:

METRO, STEELROCK AND PROSTEEL COATED STEEL ROOFING PANELS: DIRECT-TO-DECK

ADDITIONAL LISTEES:

STEELROCK ROOF PRODUCTS

2436 EAST CHAPMAN, SUITE 24

FULLERTON, CALIFORNIA 92381

PROSTEEL

3093 INDUSTRY STREET, SUITE B

OCEANSIDE, CALIFORNIA 92054

1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2015, 2012, 2009 and 2006 *International Building Code*® (IBC)
- 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:

- 2013 California Green Building Standards Code (CALGreen), Title 24, Part 11

Attributes verified:

- See Section 3.1

2.0 USES

The Metro, SteelROCK and ProSteel 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/m²). 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 Tile, Shake, Settler, and Pacific Tile: The panels are 16 inches wide by 52 inches long (406 mm by 1320 mm), and have an installed exposure of 14¹/₂ 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 1¹/₂ 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 Roman Tile: The panel is 16 inches wide by 51 inches long (406 mm by 1295 mm), with an installed exposure of 14¹/₂ inches by 49¹/₂ inches (368 mm-by-1257 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 1¹/₂ inches (38 mm) to create an overlapping edge for weather protection. Panel side laps are 1¹/₂ inches (38 mm). The panels are formed with stamped modules to simulate a series of S-shaped tiles.

3.1.3 Cottage Shingle: The panel is 15¹/₂ inches wide by 51 inches long (394 mm by 1296 mm), and has an

installed exposure of 14¹/₄ inches by 47¹/₂ 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 1¹/₂ 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.

3.1.4 Pacific Roman Villa Tile: The panel is 16 inches wide by 48 inches long (406 mm by 1219 mm), and has an installed exposure of 14¹/₂ inches by 47¹/₂ inches (368 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 1¹/₂ inches (38 mm) to create an overlapping edge for weather protection. Panel side laps are 1¹/₂ inches (38 mm). The panels are formed with stamped modules to simulate a series of interlocking tiles.

3.1.5 Pacific Shake: The panel is 16 inches wide by 49¹/₂ inches long (406 mm by 1257 mm), and has an installed exposure of 14¹/₂ inches by 47¹/₂ inches (368 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 1¹/₂ inches (38 mm) to create an overlapping edge for weather protection. Panel side laps are 2 inches (51 mm). The panels are formed with impressions to simulate a series of aged wood shakes.

3.1.6 Shingle: The Shingle consists of a panel with raised and lowered sections forming a series of shingles. The front and rear edges of the panels are formed into a "C" configuration, so that the panels interlock when overlapped. The Shingle panel is 10¹/₂ inches by 52 inches (267 mm by 1321 mm), and has an installed exposure of 9¹/₂ inches by 50 inches (241 mm by 1270 mm). Shingle side laps are 2 inches (51 mm).

3.2 Underlayment:

Underlayment must comply with, and be installed in accordance with, IBC Section 1507.5.3, 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 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 Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake: The panels must be installed directly on

solid or closely fitted minimum ¹⁵/₃₂-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 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 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 5. 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 5. 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 5. 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 5.

4.2.2 Shingle: The panels must be installed directly on solid or closely fitted minimum ¹⁵/₃₂-thick (11.9 mm) plywood or on solid or closely fitted wood structural panel sheathing complying with the applicable code. Minimum thickness of sheathing or plywood can vary with installation details and wind requirements. See Table 5 for the minimum thickness of the plywood substrate.

Fascia/starter metal is installed at the eave with corrosion-resistant, ¹/₈-inch-diameter (3.2 mm) ring shank roofing nails with ³/₈-inch-diameter (9.5 mm) heads, 1³/₈ inches (35 mm) long or of sufficient length to penetrate the decking at least ³/₄ inch (19.1 mm) or through the sheathing thickness, whichever is less. The roofing nails are spaced a maximum of 12 inches (205 mm) on center. Full panels are placed and fastened starting at the eave, with the front of the panel interlocking with the starter metal. The rear of each panel is fastened to the decking at each lap and evenly spaced intermediate points with the number and size of corrosion-resistant ring shank nails, or self-tapping screws, indicated in Table 5. The front downturn of the shingle panel interlocks with the channel formed at the rear of an overlapped panel.

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 1505.5 and IRC Section R902.1.

4.4 Wind Resistance:

Tables 1 through 4 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 4, 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.

Tables 1 and 2 are applicable to installations 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 3 and 4 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 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 5 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 4, the maximum allowable wind uplift pressure in Table 5 must be equal to or greater than the minimum required design uplift pressure in Tables 1 through 4. Table 5 is applicable to the 2015, 2012, 2009 and 2006 IBC and the 2015, 2012, 2009 and 2006 IRC.

4.5 Live Loads:

The Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake roofing panels have an allowable load of 28 psf (137 kg/m^2) 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 2015 IBC Section 1511, 2012,

2009 or 2006 IBC Section 1510, 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 Metro, SteelROCK and ProSteel steel 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 2015 and 2012 IBC Sections 1607.4 and 1607.12 and 2015 and 2012 IBC 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 October 2012 (editorially revised June 2015).

7.0 IDENTIFICATION

A tag bearing the name and address of the manufacturer (Metro Roof Products), the product name, production date code and the evaluation report number (ESR-3098) is affixed to each pallet.

**TABLE 1^{1,2}—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	133
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 1^{1,2}—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	130
50	44	48	53	62	72	82	93	99	105	118	139
60	46	51	55	65	75	86	98	104	111	124	146

For SI: 1 ft = 0.31 m; 1 psf = 4.88 kg/m²; 1 mph = 0.44m/s.

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

²Topographic 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.

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

⁴For 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.

⁵For 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^{1,2}—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
Roof Style	Gable/Hip										
Roof Slope	7° < θ ≤ 27° ~ (1½:12 to 6:12)										
Height (ft)	Roof Zone 1										
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
Height (ft)	Roof Zone 3										
0-15	42	46	50	59	69	79	89	95	101	113	133
20	45	49	53	63	73	83	95	101	107	120	141
25	47	51	56	65	76	87	99	105	112	125	147
30	49	53	58	68	79	91	103	110	116	131	153
40	52	57	62	72	84	96	109	116	124	139	163
50	54	59	65	76	88	101	115	122	130	145	170
60	56	61	67	79	91	105	119	127	134	151	177
Roof Style	Hip										
Roof Slope	7° < θ ≤ 25° ~ (1½:12 to 5½:12)										
Height (ft)	Roof Zone 1										
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
Height (ft)	Roof Zone 3										
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
Roof Style	Gable										
Roof Slope	27° < θ ≤ 45° ~ (6:12 to 12:12)										
Height (ft)	Roof Zone 1										
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
Height (ft)	Roof Zone 3										
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
Roof Style	Monoslope										
Roof Slope	10° < θ ≤ 30° ~ (2¼:12 to 7:12)										

(CONTINUED)

**TABLE 2^{1,2}—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	131	154
25	51	56	61	72	83	95	108	115	122	137	161
30	53	58	64	75	87	99	113	120	128	143	168
40	57	62	67	79	92	105	120	128	135	152	178
50	59	65	71	83	96	110	126	134	142	159	187
60	62	67	73	86	100	115	130	139	147	165	194

For **SI**: 1 ft = 0.31 m; 1 psf = 4.88 kg/m²; 1 mph = 0.44m/s.

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

²Topographic 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.

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

⁴For 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.

⁵For 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^{1,2}—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 ³							
	1	2 & 3	1	2 & 3	1	2 & 3	1	2 & 3
	GABLE / HIP ROOF 7° < θ ≤ 27° (≈1½:12 < θ ≤ ≈6:12°) ⁵							
	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 ⁴ 7° < θ ≤ 25° (≈1½:12 < θ ≤ ≈6:12°) ⁵							
	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°) ⁵							
	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/m²; 1 mph = 0.44m/s.

¹Table 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. ²Topographic factor, K_{zt} = 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_{zt} for the building site.

³See Figure 6-3, ASCE-7-05, for Roof Zones.

⁴For 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.

⁵For 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^{1,2}—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 ³							
	1	2 & 3	1	2 & 3	1	2 & 3	1	2 & 3
GABLE / HIP ROOF 7° < θ ≤ 27° (≈1½:12 < θ ≤ ≈6:12) ⁵								
Importance Factor = 1.00								
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
Importance Factor = 1.15								
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
HIP ROOF⁴ 7° < θ ≤ 25° (≈1½:12 < θ ≤ ≈6:12) ⁵								
Importance Factor = 1.00								
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
Importance Factor = 1.15								
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
MONOSLOPE ROOF 10° < θ ≤ 30° (≈2¼:12 < θ ≤ ≈7:12) ⁵								
Importance Factor = 1.00								
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
Importance Factor = 1.15								
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/m²; 1 mph = 0.44m/s.

¹Table 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.

²Topographic factor, K_{zt} = 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_{zt} for the building site.

³See Figure 6-3, ASCE-7-05, for Roof Zones.

⁴For 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.

⁵For 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.

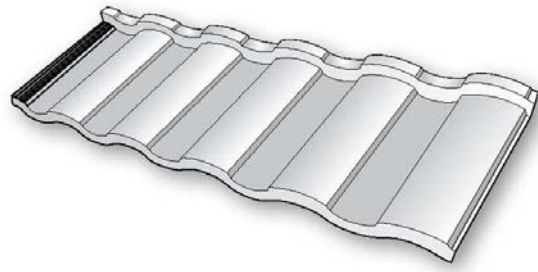
**TABLE 5—MAXIMUM ALLOWABLE WIND UPLIFT PRESSURES ON
METRO, STEELROCK AND PROSTEEL ROOFING PANELS**

SYSTEM NO.	SUBSTRATE	ROOFING PANEL	PANEL FASTENING	ALLOWABLE WIND UPLIFT PRESSURE (psf)
1	Minimum $1\frac{5}{32}$ -inch-thick plywood	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake	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	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake	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	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake	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	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake	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	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile and Pacific Shake	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	Tile, Roman Tile, Shake, Settler, Cottage Shingle, Pacific Tile, Pacific Roman Villa Tile, and Pacific Shake	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	Shingle	Four 8d x 1-inch-long, galvanized ring shank nails at backshelf of each panel	45
8	Minimum $1\frac{5}{32}$ -inch-thick plywood	Shingle	Six No. 10 x 1-inch-long, screws through the back shelf of each panel	72
9	Minimum $1\frac{5}{32}$ -inch-thick plywood	Shingle	Eight No. 10 screws through the back shelf of each panel, min. 2 inches long at rafters and min. 1 inch long between rafters	115
10	Minimum $1\frac{9}{32}$ -inch-thick plywood	Shingle	Six No. 14-10, $1\frac{1}{2}$ -inch-long, $\frac{1}{4}$ -inch-diameter hex-head screws, equally spaced at the backshelf of each panels	107
11	Minimum $1\frac{9}{32}$ -inch-thick plywood	Shingle	Ten No. 14-10, $1\frac{1}{2}$ -inch-long, $\frac{1}{4}$ -inch-diameter hex-head screws, equally spaced at the backshelf of each panels	165

For **SI**: 1 inch = 25.4 mm; 1 psf = 4.88 kg/m².



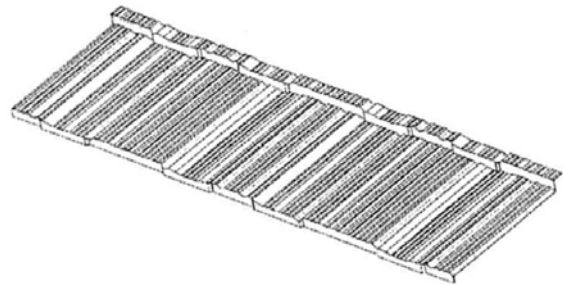
Tile



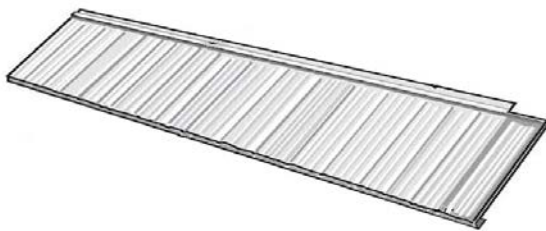
Roman Tile



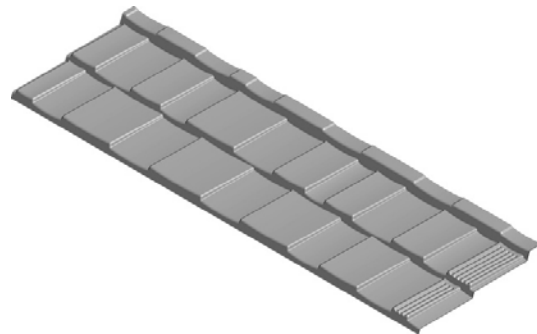
Shake



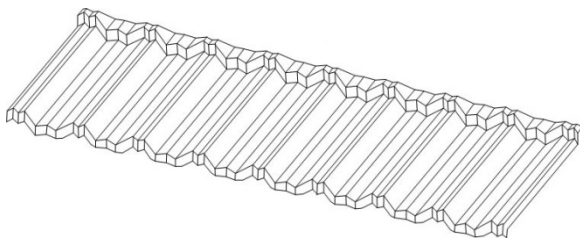
Settler



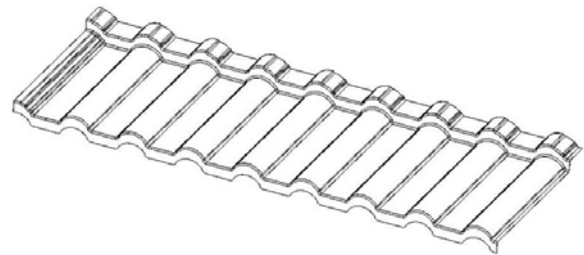
Shingle



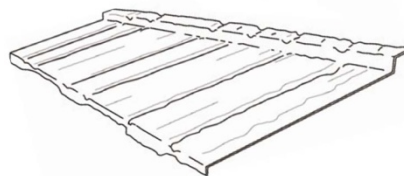
Cottage Shingle



Pacific Tile



Pacific Roman Villa Tile



Pacific Shake

FIGURE 1—PANEL PROFILES

ICC-ES Evaluation Report

ESR-3098 CBC and CRC Supplement

Issued May 2017

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Section: 07 31 16— Metal Shingles

Section: 07 41 13— Metal Roof Panels

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(760) 435-9842
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ADDITIONAL LISTEES:

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FULLERTON, CALIFORNIA 92381

PROSTEEL
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EVALUATION SUBJECT:

METRO STEELROCK AND PROSTEEL 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 Metro SteelROCK and ProSteel Coated Steel Roofing Panels: Direct-to-Deck, recognized in ICC-ES master report ESR-3098, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2016 *California Building Code* (CBC)
- 2016 *California Residential Code* (CRC)

2.0 CONCLUSIONS

2.1 CBC:

The Metro SteelROCK and ProSteel Coated Steel Roofing Panels: Direct-to-Deck described in the master 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 2015 *International Building Code*® (IBC) provisions noted in the master report.

The roofing panels may be used in the construction of new buildings located in any Fire Hazard Severity Zone within State Responsibility Areas or any Wildland-Urban Interface Fire Area, provided installation is in accordance with the 2015 *International Building Code*® (IBC) provisions noted in the master report and the additional requirements of Sections 701A.3 and 705A of the CBC.

2.2 CRC:

The Metro SteelROCK and ProSteel Coated Steel Roofing Panels: Direct-to-Deck described in the master 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 CBC Section R902.1.2, or a Class C roof covering complying with CRC Section 902.1.3, provided installation is in accordance with the 2015 *International Residential Code*[®] (IRC) provisions noted in the master report and the additional requirements of Section R905.4 of the CRC.

The roofing panels may be used in the construction of new buildings located in any Fire Hazard Severity Zone within a State Responsibility Areas or Wildland–Urban Interface Fire Area, provided installation is in accordance with the 2015 *International Residential Code*[®] (IRC) provisions noted in the master report and the additional requirements of Sections R337.1.3.1 and R337.5 of the CRC.

The products recognized in this supplement have not been evaluated for compliance with the *International Wildland–Urban Interface Code*[®].

This supplement expires concurrently with the master report, reissued February 2017 and revised May 2017.