

ICC-ES Evaluation Report


ESR-3331

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<p>DIVISION: 07 00 00— THERMAL AND MOISTURE PROTECTION</p> <p>Section: 07 31 16—Metal Shingles</p> <p>Section: 07 32 19—Metal Roof Tiles</p> <p>Section: 07 41 13—Metal Roof Panels</p>	<p>REPORT HOLDER: FEROOF CO., LTD.</p> <p>ADDITIONAL LISTEE: METSTAR USA INC.</p>	<p>EVALUATION SUBJECT: STEEL ROOFING PANELS: VENETO I, VENETO II, RIO, RIO EZ, DIVA, WOOD, ZISSEN AND SLATE</p>	
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1.0 EVALUATION SCOPE

1.1 Compliance with the following codes:

- 2009 [International Building Code® \(IBC\)](#)
- 2009 [International Residential Code® \(IRC\)](#)

Property evaluated:

- Fire classification
- Wind resistance
- Weather resistance

1.2 Evaluation to the following green code:

- 2022 [California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11

Attributes verified:

- See Section 3.1

2.0 USES

The Veneto I, Veneto II, Rio, Rio EZ, Diva, Wood, Zissen and Slate steel roofing panels are intended for installation as metal roof shingles in accordance with IBC Section 1507.5 and IRC Section R905.4, and are recognized as Class A roof coverings on new roofs and over existing roofs when installed in accordance with this report.

3.0 DESCRIPTION

3.1 General:

The steel roofing panels are press formed from sheet steel complying with ASTM A792, Commercial Grade with an AZ50 class hot-dip aluminum-zinc alloy coating. The thickness of the coated steel is 0.0157 inch (0.4 mm). The aluminum-zinc alloy coated steel has coatings applied to both sides of the steel panel. The exposed proprietary side of the roof tile is surfaced with stone chips.

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. These codes or standards often provide supplemental information as guidance.

3.1.1 Veneto I Tile: The overall panel size is 50.6 inches (1285 mm) by 16.1 inches (410 mm). The weight of the panel is approximately 5.6 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.2 Veneto II Tile: The overall panel size is 50.6 inches (1285 mm) by 16.5 inches (420 mm). The weight of the panel is approximately 5.6 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.3 Rio Tile: The overall panel size is 53 inches (1345 mm) by 16.3 inches (415 mm). The panel weight is approximately 5.8 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.4 Rio EZ Tile: The overall panel size is 53 inches (1345 mm) by 16.3 inches (415 mm). The panel weight is approximately 5.8 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.5 Wood Tile: The overall panel size is 52.6 inches (1335 mm) by 16.3 inches (415 mm). The panel weight is approximately 5.7 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.6 Zissen Tile: The overall panel size is 53.7 inches (1365 mm) by 16.3 inches (415 mm). The panel weight is approximately 5.8 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.7 Diva Tile: The overall panel size is 53 inches (1345 mm) by 16.3 inches (415 mm). The panel weight is approximately 5.8 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.1.8 Slate Tile: The overall panel size is 53 inches (1340 mm) by 16.1 inches (410 mm). The panel weight is approximately 5.8 lbs. The installed weight of the panel is 1.1 psf (5.4 kg/m²).

3.2 Accessories:

Accessories are supplied by FERROOF and are as described in Section 4.2.5.

3.3 Underlayment:

For roofing assemblies permitted to be nonclassified, underlayment and ice barrier must comply with IBC Section 1507.5 or IRC Section R905.4. For roof assemblies required to have roof classification, underlayment must be installed in accordance with [Table 2](#).

4.0 INSTALLATION

4.1 General:

Installation of Veneto I, Veneto II, Rio, Rio EZ, Diva, Wood, Zissen and Slate steel roof tiles must comply with this report, the manufacturer's published installation instructions, and the applicable code. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

4.2 New Construction:

4.2.1 Support Conditions: The roofing panels must be installed on roofs having a slope of 3:12 (25%) or greater. Roof rafters must be spaced not more than 24 inches (610 mm) on center. Roof panels must be installed over solid sheathing or closely fitted sheathing complying with the applicable code.

4.2.2 Underlayment: Underlayment must comply with Section 1507.5.3 of the IBC or Section R905.4.3 of the IRC, as applicable, except as noted in [Table 2](#).

4.2.3 Veneto I Panel Installation: The panels must be installed directly over closely spaced, minimum ¹⁵/₃₂-inch-thick (12 mm) plywood or solid sheathing complying with the applicable code.

Fasteners specified in [Table 1](#) must be installed through the panel above the panel ridge, penetrating a minimum of 1¹/₂ inches (38 mm) into the deck.

Panels in the upper course must lap panels in the lower course at the lower vertical face of the lower course panel ridge. The fasteners specified in [Table 1](#) must be installed at the laps through two plies of panel.

See [Tables 1, 3](#) and [4](#) for typical installation details. Panel side laps in adjacent courses must be staggered a minimum of one pan or impression.

4.2.4 Veneto II, Rio, Rio EZ, Wood, Zissen, Diva and Slate Panel Installation: The panels and battens must be installed over closely spaced, minimum $1\frac{5}{32}$ -inch-thick (12 mm) plywood or solid sheathing complying with the applicable code. Wood battens, nominally 2-by-2 lumber spaced a maximum 15 inches (381 mm) on center, are attached to the deck with rafters spaced a maximum of 24 inches (610 mm) on center. Battens must be fastened to each rafter using fasteners with the minimum sizes as specified in [Table 1](#) of this report and having sufficient length to penetrate a minimum of $1\frac{1}{2}$ inches (38 mm) into the rafter.

Panels in the upper course must lap panels in the lower course at the lower vertical face of each batten. The fasteners specified in [Table 1](#) must be installed at the laps through two plies of panel into the face of the batten.

Fasteners specified in [Table 1](#) must be installed through the panel at the upper horizontal face of each batten, penetrating a minimum of $1\frac{1}{2}$ inches (38 mm).

See [Tables 1, 3](#) and [4](#) for typical installation details. Panel side laps in adjacent courses must be staggered a minimum of one pan or impression.

4.2.5 Flashing, Edges and Hips and Ridges: Valley flashing must comply with IBC Section 1507.5.7 or IRC Section R905.4.6, as applicable.

Roof openings must be flashed in accordance with IBC Section 1503.2 or IRC R903.2, as applicable. Openings through the roof for vents, etc., must be waterproofed and supported by additional blocking or roof framing as required by the code.

At gable edges, a continuous rake cap or barge cover of the same material as the panels, supplied by FERROOF, must be installed in accordance with the manufacturer's published installation instructions.

At hips and ridges, panels must be cut, bent and installed, and hip and ridge caps of the same material as the panels, supplied by FERROOF, must be installed in accordance with the manufacturer's published installation instructions.

4.3 Reroofing Applications:

4.3.1 General: The existing roof covering must be completely removed and the panels and new underlayment installed in accordance with Section 4.2, except over asphalt shingles as described in this section. For existing wood shake roofs, following the removal of the wood shakes, the panels may be installed over existing spaced sheathing provided the gaps are filled in to provide closely fitted decking having joints spaced approximately $\frac{1}{8}$ inch. The fill lumber must be of the same thickness as the existing spaced sheathing. FERROOF steel roof panels may be installed over existing asphalt shingle roofs, provided the requirements of IBC Section 1510 or IRC Section R907 are met.

4.3.2 Support Conditions: Roofing panels must be installed on roofs having a slope of 3:12 (25%) or greater. Roof rafters must be spaced not more than 24 inches (610 mm) on center.

4.3.3 Batten Installation: Battens must be nominally 2-by-2 lumber. Battens must be fastened to each rafter using fasteners with the minimum sizes as specified in [Table 1](#) of this report and having sufficient length to penetrate a minimum of $1\frac{1}{2}$ inches (38 mm) into the roof sheathing or through the roof sheathing, whichever is less.

4.3.4 Panel Installation: Panel installation must be the same as for new construction. See Sections 4.2.3, 4.2.4 and 4.2.5.

4.4 Allowable Negative Wind Pressures:

FERROOF roofing panels must be installed where the negative design wind pressure, determined in accordance with Section 1609 of the IBC or Section R301.2.1 of the IRC, as applicable, does not exceed the allowable wind uplift pressure specified in [Table 1](#) of this report.

4.5 Fire Classification:

When installed in accordance with Section 4.0 and [Table 2](#) of this report, FERROOF panels are recognized as Class A roof assemblies in accordance with IBC Section 1505.2 and IRC Section R902.1, based on testing in accordance with UL 790.

The Metstar Building Products Inc. panels are limited to use as nonclassified roof covering.

5.0 CONDITIONS OF USE:

The FERROOF Co., Ltd., 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 Panels must be installed in accordance with this report and the manufacturer’s published installation instructions. In the event of conflict between this report and the manufacturer’s published installation instructions, this report governs.
- 5.2 The roofing panels are manufactured in Korea, under a quality control program with inspections by ICC-ES.


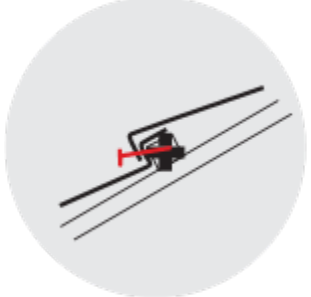
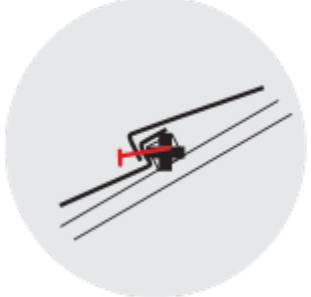
6.0 EVIDENCE SUBMITTED

Data in accordance with ICC-ES Acceptance Criteria for Metal Roof Coverings (AC166), dated October 2012.

7.0 IDENTIFICATION

- 7.1 A label is affixed to each pallet or bundle bearing the manufacturer’s name (FERROOF Co., Ltd.) and address (or the name and address of the additional listee), the product name, and the evaluation report number (ESR-3331).
- 7.2 The report holder’s contact information is the following:
FERROOF CO., LTD.
565-1 SEONWON-LI SEONNAM-MYEON
SUNGJU-GUN
KYEONGSANGBUK-DO 40048
SOUTH KOREA
<http://myroof.co.kr/english/main.php>
qc@ferroof.com
- 7.3 The additional listee’s contact information is the following:
METSTAR USA INC.
300 INTERNATIONAL DRIVE, SUITE 100
BUFFALO, NEW YORK 14221

TABLE 1—ALLOWABLE WIND UPLIFT PRESSURES

Panel Type	Panel to Panel Fasteners	Panel to Deck Fasteners	Panel Fastener Installation	Allowable Wind Uplift Pressure (psf)
Veneto I	No. 9 by 1½-inch-long hex head screws, five screws per panel head lap. maximum spacing 17.3 inches (439 mm)	No. 9 by 1½-inch-long hex head screws, five screws per panel maximum spacing 19.7 inches (500 mm)		60
Panel Type	Panel to Batten ¹ & Deck Fasteners	Panel to Deck Fasteners	Panel Fastener Installation	Allowable Wind Uplift Pressure (psf)
Veneto II	No. 9 by 1½-inch-long hex head screws, five screws per panel head lap. maximum spacing 17.3 inches (439 mm)	No. 10 by 3 ½-inch-long hex head screws, maximum spacing 24 inches (610 mm)		67
Rio Rio EZ Wood Zissen Diva Slate	No. 9 by 1½-inch-long hex head screws, Five screws per panel head lap. maximum spacing 12.6 inches (320 mm)	No. 10 by 3 ½-inch-long hex head screws, maximum spacing 24 inches (610 mm)		67

For SI: 1 inch = 25.4 mm, 1 psf = 48 PA.

¹Battens must be 2 by 2 inches No. 2 Grade, spaced maximum 15 inches on center.

TABLE 2—FIRE CLASSIFICATION ASSEMBLIES²

Panel Type	Substrate	Barrier Board ¹	Underlayment	Max. Roof Incline	Roof Class
Veneto I Veneto II Rio Rio EZ Wood Zissen Diva Slate	Closely fitted, Minimum ¹⁵ / ₃₂ -inch plywood or sheathing	Min. ¹ / ₄ -inch-thick G-P Gypsum DensDecks®; or, min. ¹ / ₂ -inch-thick gypsum board	Underlayment complying with ASTM D226 Type II or ASTM D4869	Unlimited	A
		None	GAF VersaShield® Fire- Resistant Roof Deck Protection (ESR-2053)		

For SI: 1 inch = 25.4 mm, 1 psf = 48 PA.

¹All barrier board joints to be staggered a minimum of 6 inches from joints in plywood or sheathing.

²Battens, when used, must be installed over the barrier board or GAF VersaShield® Fire-Resistant Roof Deck Protection.

TABLE 3—FASTENING PATTERN

Panel Type	FASTENER SPACING ILLUSTRATION	
Veneto I	<p>FLOOR PLAN</p>	<p>PERSPECTIVE 3D VIEW</p>
Veneto II	<p>FLOOR PLAN</p>	<p>PERSPECTIVE 3D VIEW</p>
Rio	<p>FLOOR PLAN</p>	<p>PERSPECTIVE 3D VIEW</p>
Rio EZ	<p>FLOOR PLAN</p>	<p>PERSPECTIVE 3D VIEW</p>

TABLE 3—FASTENING PATTERN (CONTINUED)

<p>Wood</p>		
<p>Zissen</p>		
<p>Diva</p>		
<p>Slate</p>		

TABLE 4—SIDE LAPS

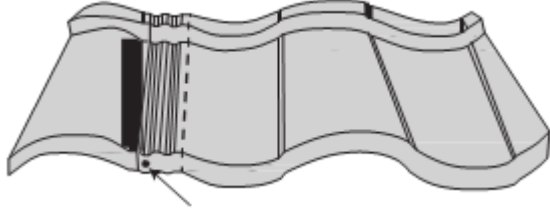
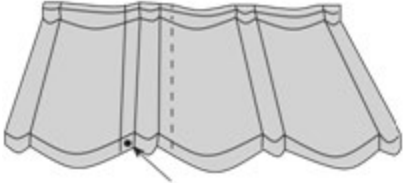
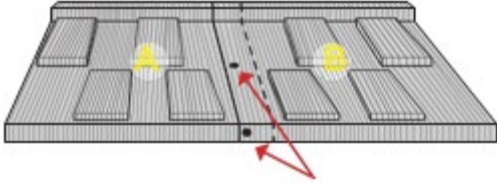
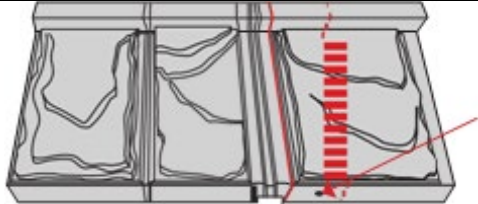
Panel Type	Side Lap Width	Panel Side Lap Fastener(s) Location
Veneto I	70 mm (2.8 in.)	
Veneto II	70 mm (2.8 in.)	
Rio	65 mm (2.6 in.)	
Rio EZ	65 mm (2.6 in.)	
Wood	55 mm (2.2 in.)	
Zissen	65 mm (2.6 in.)	
Diva	65 mm (2.6 in.)	
Slate	60 mm (2.4 in.)	

TABLE 5—PRODUCT CROSS REFERENCE

FEROOF Co., LTD	Veneto I	Veneto II	Rio	Rio EZ	Diva	Wood	Zissen	Slate
Metstar Building Products, Inc.	MetStar DaVinci FV I	MetStar DaVinci FV II	MetStar Tile FR	MetStar Tile FR EZ	MetStar Slate FD	MetStar Shake FW	MetStar Tile 2 FZ	MetStar Slate MF