The panels incorporate a 1\(\frac{1}{2}\) inch (38 mm) headlap and a 3-inch-wide (76 mm) side lap on the right side of each panel. The panels' leading front edge is bent down to form a front lip that locks into the up-facing lip formed at the top back edge of each panel. The installed weight of the steel roofing panels is approximately 1.0 psf (4.88 kg/m\(^2\)). See Figure 1 for panel and flashing profiles.

The attributes of the steel roof panels have been verified as conforming to the requirements of CALGreen Section A5.4.06.1.2 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.

3.1.2 Accessories: Ridge and hip caps are manufactured of the same steel material and with the same thicknesses and finishes as described above. Drip, gable and wall flashing components are manufactured of the same steel material and finish as described above in a thickness not less than 0.019 inch (0.483 mm) (No. 26 galvanized sheet).

3.2 Fasteners: Fasteners for the steel panels must be galvanized steel, minimum 1\(\frac{1}{2}\)-inch-long, No. 8 wood screws, with nominally 0.315-inch-diameter (8.0 mm) pan heads.

3.3 Underlayment: Underlayment must comply with IBC Section 1507.5.3 or IRC Section R905.4.3, as applicable, except the underlayment must conform to ASTM D226, Type II, instead of ASTM D226, Type I. In areas where the average daily temperature in January is 25 F (-4 C) or less or where there is a possibility of ice forming along the eaves, causing a backup of water, an ice barrier must be installed in accordance with IBC Section 1507.5 and IRC Section R905.4. On construction permitted to be nonclassified roofing, an underlayment may be used that is recognized in an ICC-ES evaluation report as an alternate to the ASTM D226, Type II, underlayment specified in Chapter 15 of the IBC and Chapter 9 of the IRC.
4.0 INSTALLATION

4.1 Roof Slope:
The panels must be installed on minimum 3:12 (25 percent-slope) roof slopes.

4.2 Installation—New Construction:
The panels must be installed on solid, minimum 19⁄32-inch-thick (11.9 mm), plywood sheathing complying with the applicable code or on filled-in spaced sheathing as described in Section 4.3. Underlayment, as described in Section 3.3, must be applied in accordance with the requirements of the applicable code. Full roof panels are placed over the underlayment starting at the eave. The front of the panels in the first course must be hooked into the lip of the drip cap flashing. The panels overlap on the right side of each panel by 3 inches (76 mm). The rear of each panel is fastened to the sheathing with fasteners as described in Table 1. Four fasteners must be equally spaced along the panel at a maximum spacing of 12 inches (305 mm) on center. The fasteners must be as specified in Section 3.2 and must be of sufficient length to penetrate a minimum of 3⁄4 inch (19.1 mm) into the roof sheathing or through the roof sheathing, whichever is less. The front of each panel must be attached to the rear of the panel beneath by inserting and locking the front lip into the rear lip on the lower panel. At valleys, additional fastening details apply, as shown in Figure 2.

A Rare Manufacturing–supplied valley flashing, as illustrated in Figures 1 and 2, must be installed and the panels must be cut and formed into either side of the open valley flashing. The valley flashings comply with IBC Section 1507.5.6 and IRC Section R905.4.6. Other flashing must comply with IBC Section 1503.2.1 or IRC Section R903.2.1, as applicable.

Penetrations through the roof covering must be flashed in accordance with the manufacturer’s published installation instructions and the applicable code. The panels containing the penetration must be cut out to allow water drainage from the flashing to the top of the panel below, as noted in Figure 2.

4.3 Installation—Reroofing:
The existing roof covering must be completely removed and the panels and new underlayment installed in accordance with Section 4.2, except over asphalt shingle roofs 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 space between boards is filled with lumber as necessary to provide a base for fastening. The fill lumber must be of the same thickness as the existing spaced sheathing. The Ironwood Shake roofing panels may be installed over existing asphalt shingle roofs, provided the roof slope complies with Section 4.1 of this report and the requirements of IBC Section 1510 or IRC Section R907 are met. The panels must be fastened through the existing asphalt shingle roof covering to the roof sheathing in the same manner as described in Section 4.2, with screws (described in Section 3.2) of sufficient length to penetrate into the sheathing 3⁄4 inch (19.1 mm) or through the sheathing, whichever is less. New flashing must be installed over and around all existing flashing, vents, valleys and chimneys in accordance with this report and the applicable code. Raised perimeters must be covered by the Ironwood Shake roofing panels.

4.4 Fire Classification:
Ironwood Shake steel roofing panels installed in accordance with Section 4.2 or 4.3 are recognized as nonclassified roof assemblies in accordance with IBC Section 1505.2 and under IRC Section R902.1.

4.5 Wind Resistance:
Ironwood Shake steel roofing panels, installed in accordance with this report, have the maximum allowable uplift load specified in Table 1. The design wind pressure must be determined in accordance with IBC Section 1609.5 and IRC Section R301.2.1.

Positive (gravity) loads are limited to the adequacy of the supporting structural framing and sheathing.

5.0 CONDITIONS OF USE
The Ironwood Shake 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 the manufacturer’s published installation instructions and this report, this report governs.

5.2 The panels are manufactured in Surrey, British Columbia, Canada, 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.

7.0 IDENTIFICATION
7.1 Applied to each pallet or bundle is a label bearing the manufacturer’s name (Rare Manufacturing Inc.) and address, the product name, the production batch number and the evaluation report number (ESR-2134).

7.2 The report holder’s contact information is the following:
RARE MANUFACTURING INC.
19154-95A AVENUE
SURREY, BRITISH COLUMBIA V4N 4P2
CANADA
(604) 882-2888
www.raremanufacturing.com

<table>
<thead>
<tr>
<th>PANEL TYPE</th>
<th>FASTENER TYPE1</th>
<th>NUMBER OF FASTENERS PER PANEL</th>
<th>ALLOWABLE UPLIFT LOAD, psf (kPa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel</td>
<td>Galvanized steel No. 8 wood screw</td>
<td>4</td>
<td>72.5 (3.47)</td>
</tr>
</tbody>
</table>

For St: 1 psf = 0.04788 kPa.

1Fasteners are as specified in Section 3.2 of this report. For reroofing, the length of the fasteners must be increased to penetrate into the sheathing 3⁄4 inch (19.1 mm) or through the sheathing, whichever is less.
**FIGURE 1—IRONWOOD SHAKE PANEL AND FLASHING PROFILES**

**IRONWOOD SHAKE**
- Overall Length: 51"
- Length of Coverage: 48"
- Width of Coverage: 12"
- Total Shake Coverage: 4 sq. ft.
- Weight: 4.01 lbs
- Shakes per box (52" x 16" x 6"): 20 pcs
- Shakes per square: 25 pcs
- Shakes per pallet (24 boxes): 460 (19.2 sq.)
- Weight of full pallet (48" x 45" x 57"): 1975 lbs

**IRONWOOD SHAKE CAP**
- Overall Length: 14"
- Length of Coverage: 12"
- Weight: 0.55 lb
- Shake Caps per box (18" x 14.5" x 21") 50 pcs
- Shake Caps per pallet (12 boxes): 600 pcs

**IRONWOOD Drip 1.5" & Re-Roof Drip**
- Overall Length: 96"
- Length of Coverage: 93"
- A) Drip 1.5" - Weight (6") 3.62 lbs
- B) Re-roof Drip - Weight (8") 4.83 lbs

**IRONWOOD GABLE**
- Overall Length: 96"
- Length of Coverage: 93"
- Weight (8") 4.83 lbs

**IRONWOOD WALL**
- Overall Length: 96"
- Length of Coverage: 93"
- Weight (8") 4.83 lbs

**IRONWOOD 20" VALLEY**
- Overall Length: 96"
- Length of Coverage: 93"
- Weight (20") 12.08 lbs
<table>
<thead>
<tr>
<th>FIGURE 2 — TYPICAL INSTALLATION DETAILS OF IRONWOOD SHAKE PANEL AND FLASHINGS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DECK REQUIREMENTS</strong></td>
</tr>
<tr>
<td>SOLID SHEETED DECK REQUIRED</td>
</tr>
<tr>
<td>New Construction: Requires solid sheathed deck</td>
</tr>
<tr>
<td>Asphalt Re-Roof: Per local building code, okay to install over asphalt</td>
</tr>
<tr>
<td>Cedar Re-Roof: Tear-off cedar, fill in deck as necessary – max. spacing 4&quot; gap.</td>
</tr>
<tr>
<td><strong>DRIP CAP FLASHING</strong></td>
</tr>
<tr>
<td>Drip cap: Drip cap to be installed prior to underlayment, install drip cap to hang over fascia board</td>
</tr>
<tr>
<td><strong>UNDERLAMENT</strong></td>
</tr>
<tr>
<td>APPLY UNDERLAMENT OVER PREPARED DECK</td>
</tr>
<tr>
<td>New Construction: Requires min. ASTM D226 Type II</td>
</tr>
<tr>
<td>Asphalt Re-Roof: Per local building code. If no underlayment required, must ensure existing roof is water tight (i.e. spot repair with ice &amp; water shield) prior to installation of metal panels</td>
</tr>
<tr>
<td>Cedar Re-Roof: Requires min. ASTM D226 Type II</td>
</tr>
<tr>
<td><strong>GABLE FLASHING</strong></td>
</tr>
<tr>
<td>Gable: Install gable flashing to hang over fascia board</td>
</tr>
<tr>
<td><strong>VALLEY FLASHING</strong></td>
</tr>
<tr>
<td>Valley Flashing: Install valley flashing, fastened as shown. (Do not fasten inside the edges of valley flashing)</td>
</tr>
</tbody>
</table>

**AT THIS POINT ALL DRIP CAP, GABLE AND VALLEY FLASHING SHOULD BE INSTALLED BEFORE PROCEEDING WITH THE SHAKE PANEL INSTALLATION**
FIGURE 2—TYPICAL INSTALLATION DETAILS OF IRONWOOD SHAKE PANEL AND FLASHINGS (Continued)
### PLUMBING VENT & FLASHING

**FIRST SHAKE PANEL**
- CUT OUT HOLE
- INSTALL OVER PLUMBING VENT

**SECOND SHAKE PANEL**
- CUT OFF S-LOCK
- CUT OUT HOLE
- CUT OUT BOTTOM LIP

**First Shake Panel:**
Cut out hole in first shake panel & install over plumbing vent. Slide plumbing vent flashing over top.

**Second Shake Panel:**
Cut a second shake panel as shown, note the top s-lock portion is cut off and a section matching the width of the vent flashing is cut out of the bottom lip to allow for drainage. Install second shake panel directly over top of first shake panel tucking cut edge under s-lock and hook bottom lip on.

### HIP AND RIDGE CAP

**SHAKE PANELS**
- FASTEN HERE
- 2 X 2 BATTEN

**SHAKE CAPS**
- PEEL & STICK

**SHAKE CAP**

**Hip & Ridge:**
Ensure that shake panels butt up against each other at the hip/ridge to form an even/straight line. Next, fasten 2x2 to hip/ridge, apply peel & stick overlap of 2x2 along the entire length of hip/ridge. Finally, install caps starting at the bottom using two fasteners per cap. Each cap overlaps the previous one and fasten as shown.

### WALL/CHIMNEY FLASHING

**WALL/CHIMNEY FLASHING**

**Wall Flashing:**
Bend shake panel up against wall, fasten wall flashing overlap as shown, underneath existing counter flashing or siding.

### ADDITIONAL INFORMATION:

- **Fasteners:** 1½" (#8), galvanized, painted screws supplied by Rare Mfg.
- **Tools:** Screw gun & driver finder, nail gun, tin snips/power snips to cut shake panels (no saw blades) & hand folder supplied by Rare Mfg.

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**FIGURE 2—TYPICAL INSTALLATION DETAILS OF IRONWOOD SHAKE PANEL AND FLASHINGS (Continued)**