

# ICC-ES Evaluation Report

ESR-1461

Reissued March 2024


This report also contains:

Subject to renewal March 2025

- LABC Supplement
- CBC Supplement
- FBC Supplement

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<p><b>DIVISION: 06 00 00—</b> <b>WOOD, PLASTICS AND COMPOSITES</b></p> <p><b>Section: 06 50 00—</b> <b>Structural Plastics</b></p> <p><b>Section: 06 53 00—</b> <b>Plastic Decking</b></p> <p><b>Section: 06 63 00—</b> <b>Plastic Railings</b></p>	<p><b>REPORT HOLDER:</b> <b>AVON PLASTICS</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>RHINO COMPOSITE DECK BOARDS (ALSO KNOWN AS ALL SEASON, WOODLAND, SEASONS, NORTH DEX AND WEST STAR)</b></p> <p><b>ARMADILLO HERITAGE, LIFESTYLE AND EVOLUTION COMPOSITE DECK BOARDS (ALSO KNOWN AS ARMADILLO ESSENTIAL) WITH WEATHERABLE CAP</b></p>	
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## 1.0 EVALUATION SCOPE

### 1.1 Compliance with the following codes:

- 2021, 2018 and 2015 [International Building Code® \(IBC\)](#)
- 2021, 2018 and 2015 [International Residential Code® \(IRC\)](#)

For evaluation for compliance with codes adopted by the [Los Angeles Department of Building and Safety \(LADBS\)](#), see [ESR-1461 LABC and LARC Supplement](#).

### Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

### 1.2 Evaluation to the following green code(s) and/or standards:

- 2022 [California Green Building Standards Code \(CALGreen\)](#), Title 24, Part 11
- 2020, 2015, 2012 and 2008 [ICC 700 National Green Building Standard™](#) (ICC 700-2020, ICC 700-2015, ICC 700-2012 and ICC 700-2008)

### Attributes verified:

See Section 3.1

## 2.0 USES

The Avon Plastics Composite Deck Boards described in this report are limited to exterior use as deck boards for balconies, porches, stair treads and decks for buildings of Type V-B (IBC) construction, and dwellings constructed in accordance with the IRC. The composite deck boards comply with ASTM D7032 except for slip resistance, which has not been evaluated.

## 3.0 DESCRIPTION

### 3.1 General:

Avon Plastics Composite Deck boards are made from a manufactured composite material that consists of at least 50 percent wood fibers by weight, with the remainder of the material being a thermoplastic polymer plastic. The deck boards are manufactured by an extrusion process in accordance with the approved quality control manual, to produce comparable lumber-sized members. Avon Plastics Rhino composite deck boards are manufactured in Acorn Brown, Adobe, Barnwood Gray, Earth, Cedar, Chestnut, and Slate colors. The Armadillo Heritage. Lifestyle and Evolution deck boards are made from the same materials as the other Rhino Composite Deck Boards except that a 0.03 inch-thick (0.8 mm) layer of cap stock is applied around the exterior of the board. Avon Plastics Armadillo Heritage Composite Deck boards are available in Painted Desert, Canyon Gray and Rustic Red colors. Avon Plastics Armadillo Lifestyle (Essential) Composite Deck boards are available in Canyon Gray/Smoke, Coyote, Painted Desert/Campfire, Rustic Red/Sunset, Slate/Foothills, Tortoise, Tumbleweed/Bronco, Vintage, Walnut, and White Sand colors. Avon Plastics Armadillo Evolution Composite Deck Boards are available in Steel Wool, Firewood, Mesa, Bourbon, Linen, and Twilight colors.

The attributes of the composite deck boards have been verified as conforming to the provisions of (i) CALGreen Section A5.406.1.2 for reduced maintenance; (ii) ICC 700-2020, ICC 700-2015 and ICC 700-2012 Sections 602.1.6 and 11.602.1.6 for termite-resistant materials (iii) ICC 700-2020 Sections 601.7 and 11.601.7 and ICC 700-2015 and ICC 700-2012 Sections 601.7, 11.601.7, and 12.1(A).601.7 for site-applied finishing materials; and (iii) ICC 700-2008 Section 602.8 for termite-resistant materials and Section 601.7 for site-applied finishing materials. 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. See Section 5.9 for limitations on termite-resistance use.

### 3.2 Deck Board:

**3.2.1 General:** The Avon Plastics deck boards are manufactured in nominal dimensions as noted in [Table 1](#). [Figure 1](#) provides dimensioned cross-sectional profiles of the boards.

**3.2.2 Durability:** When subjected to weathering, insect attack, and other decaying elements, material used to manufacture the Avon Plastics deck boards described in this report is equivalent in durability to code-complying preservative-treated or naturally durable lumber when used in locations described in Section 2.0 of this report. Avon Plastics products have been evaluated for structural performance when exposed to temperatures ranging from 20°F (29°C) to 125°F (52°C).

**3.2.3 Surface-burning Characteristics:** When tested in accordance with ASTM E84, the Avon Plastics deck boards described in this report have a flame-spread index of no greater than 200.

### 3.3 Hidden Fastening Systems:

**3.3.1 Rhino Vision Clips:** Rhino Vision Clips are designed specifically for Rhino composite deck boards having grooved-edges and consist of hidden clips that are made from high density polyethylene (HDPE) and No. 7 by 2<sup>1</sup>/<sub>2</sub>-inch-long (64 mm) corrosion resistance screws. See [Figure 2](#) for dimensions for the clips.

**3.3.2 TURBOCLIP™ Universal Hidden Deck Clips:** Turboclip™ Universal Hidden Deck Clips are designed specifically for composite deck boards having grooved-edges and consist of hidden clips that are made from glass filled nylon and No. 8 by 1<sup>3</sup>/<sub>4</sub>-inch-long (44 mm) stainless steel screws. See [Figure 2](#) for dimensions for the clips.

## 4.0 DESIGN AND INSTALLATION

### 4.1 General:

Installation of the Avon Plastics Composite Deck boards described in this report must comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions must be available at the jobsite at all times during installation. When the manufacturer's published installation instructions differ from this report, this report governs.

### 4.2 Deck Boards:

**4.2.1 General** The Avon Plastics Composite Deck boards must be installed with a minimum board edge spacing (gap between the sides of the boards) of <sup>3</sup>/<sub>16</sub> inch (4.8 mm), and a minimum deck board end spacing of <sup>1</sup>/<sub>16</sub> inch (1.6 mm) for every 16-foot (4.88 m) length of board for every 20°F (11°C) temperature difference between the temperature at time of installation and the maximum temperature that can be expected.

**4.2.2 Allowable Spans:** [Table 1](#) lists allowable spans for Avon Plastics Composite Deck boards installed perpendicular to the support framing. [Table 2](#) lists the Avon Plastics Composite Deck boards permitted to be used as stair treads provided the maximum span does not exceed 11 inches (279 mm).

**4.2.3** Avon Plastics Composite Deck boards must be attached to the framing with No. 8 by 2<sup>1</sup>/<sub>2</sub>-inch (64 mm) stainless steel screws for the nominal 2-by-4 and 2-by-6 boards, and No. 8 by 2<sup>1</sup>/<sub>4</sub>-inch (57 mm) for nominally 5/4-by-5.5 solid core boards. Screws must be placed a minimum of 2<sup>3</sup>/<sub>4</sub> inches (70 mm) from the end of each deck board and <sup>3</sup>/<sub>4</sub> inch (19 mm) from edges.

For the grooved deck boards, one screw must be installed at each supporting framing member at 16 inches (406 mm) along the outer edge of each deck board. The inner edge of each deck board must be fastened using a Rhino Vision Clip with a No. 7 by 2<sup>1</sup>/<sub>2</sub>-inch-long (64 mm) screw, or a TURBOCLIP™ Universal Hidden Deck Clip with No. 8 by 1-<sup>3</sup>/<sub>4</sub>-inch-long (44 mm) stainless steel screw, attached to the edge groove at each supporting member. The grooved deck boards, when installed perpendicular to the supporting construction with the hidden fastening systems described in Section 3.3, have an uplift rating of 100 psf (4788 Pa) up to a maximum span of 16 inches (406 mm) when installed at each support.

For driven fasteners having a diameter equal to 0.148 inch (3.8 mm) or less, Avon Plastics recommends pre-bored holes. For driven fasteners having a diameter greater than 0.148 inch (3.8 mm), pre-bored holes are required. The diameter of the bored hole must not exceed 90 percent of the fastener diameter.

**4.2.4 Deck Boards Used as Stair Treads:** Avon Plastics Composite Deck boards nominally 5/4-by-5.5 solid core deck boards meet the code-prescribed concentrated load of 300 lbf (1.33 kN) when installed at a maximum center-to-center spacing noted in [Table 2](#), and must have a minimum of two continuous spans over three supports.

## 5.0 CONDITIONS OF USE:

The Avon Plastics Composite Deck boards 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 Avon Plastics Composite Deck boards described in this report is limited to exterior use as deck boards for balconies, porches, stair treads, and decks for buildings of Type V-B (IBC) construction, and dwellings constructed in accordance with the IRC.
- 5.2** Avon Plastics Composite Deck boards must be directly fastened to supporting construction. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must verify that the supporting construction complies with the applicable building code requirements and is adequate to resist the loads imparted upon it from the products and systems discussed in this report. The documents must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.
- 5.3** Adjustment factors outlined in the AWC *National Design Specification for Wood construction* and applicable codes must not apply to the allowable capacity and maximum spans for Avon Plastics Rhino and Armadillo Composite Deck boards.
- 5.4** The compatibility of the fasteners with the supporting construction, including chemically treated wood, is outside the scope of this report.
- 5.5** Avon Plastics Composite Deck boards must be gapped to permit adequate drainage in accordance with Section 4.2.1 and the manufacturer's instructions.
- 5.6** Avon Plastics Composite Deck boards must not be attached to any solid surface or watertight flooring system, such as sheathing, waterproof membranes, concrete, roof decks, or patios.
- 5.7** Avon Plastics Composite Deck boards must be fastened directly to floor joists having adequate strength and stiffness in accordance with the applicable code.
- 5.8** The use of wood posts, with or without post sleeves, is outside the scope of this report.
- 5.9** Evaluation of the deck boards for resistance to Formosan termites is outside the scope of this report.
- 5.10** The products are produced by Avon Plastics at their facility located in Paynesville, Minnesota, under a quality control program with inspections by ICC-ES.

## 6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems \(Guards and Handrails\) \(AC174\)](#), dated January 2012 (editorially revised March 2021).

## 7.0 IDENTIFICATION

7.1 Each piece of product must be identified by a stamp or nonremovable label noting the name of the product and the manufacturer (“Avon Plastics”); the evaluation report number (ESR-1461).

7.2 The report holder’s contact information is the following:

**AVON PLASTICS**  
**210 AMPE DRIVE**  
**PAYNESVILLE, MINNESOTA 56362**  
**(320) 845-2111**  
[www.avonplastics.com](http://www.avonplastics.com)  
[nick.demuth@avonplastics.com](mailto:nick.demuth@avonplastics.com)

**TABLE 1—DECK BOARD SPAN RATINGS<sup>1,2</sup>**

NOMINAL DIMENSIONS (inches)	Maximum Span (in)	Allowable Capacity (lbf/ft <sup>2</sup> )
5/4-by-5.5 Solid Core	16	100
5/4-by-5.5 Vision Groove	16	100
2-by-4 Solid Core	24	100
2-by-6 Solid Core	24	100
5/4-by-5.5 Armadillo Heritage Solid	16	100
5/4-by-5.5 Armadillo Heritage Groove	16	100
5/4-by-5.5 Armadillo Lifestyle Solid	16	100
5/4-by-5.5 Armadillo Lifestyle Groove	16	100
5/4-by-5.5 Armadillo Evolution Solid	16	100
5/4-by-5.5 Armadillo Evolution Groove	16	100

For **SI**: 1 inch = 25.4 mm, 1 psf = 47.9 Pa.

<sup>1</sup>Maximum span is measured center-to-center perpendicular of the supporting construction.

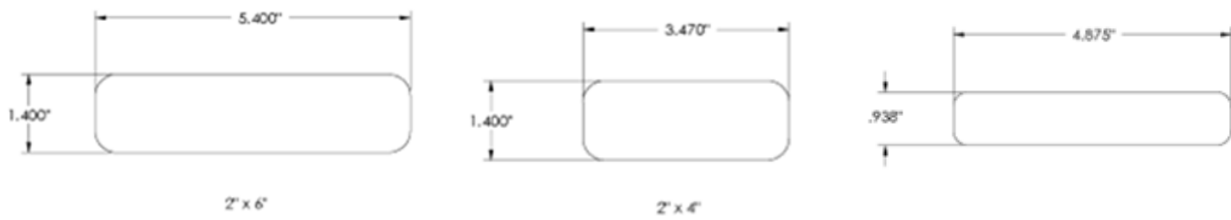
<sup>2</sup>Maximum allowable capacity is adjusted for durability. No further increases are permitted.

**TABLE 2—MAXIMUM STAIR TREAD SPANS**

DECK BOARD USED AS STAIR TREAD	MAXIMUM SPAN (in) <sup>1,2</sup>
Rhino solid deck board (5/4-by-5.5)	11.0
Armadillo Heritage solid deck board (5/4-by-5.5)	11.0
Armadillo Lifestyle solid deck board (5/4-by-5.5)	10.0
Armadillo Evolution solid deck board (5/4-by-5.5)	10.0

<sup>1</sup>Maximum span is measured center-to-center of the support framing.

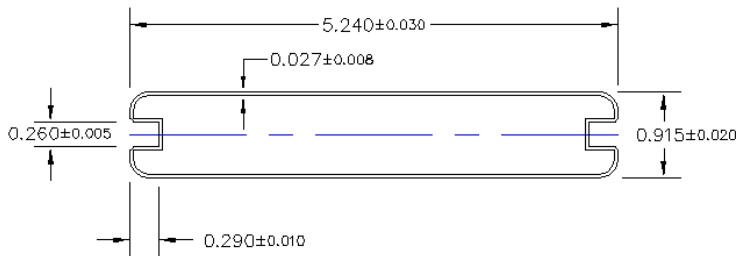
<sup>2</sup>Based on minimum two-span installation.



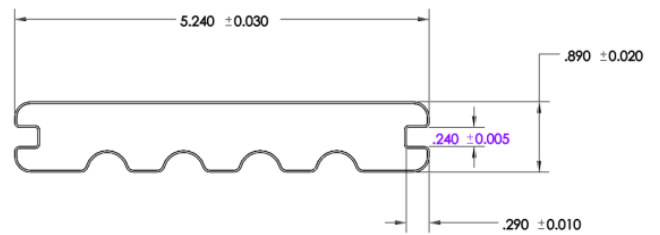
Rhino Composite Solid



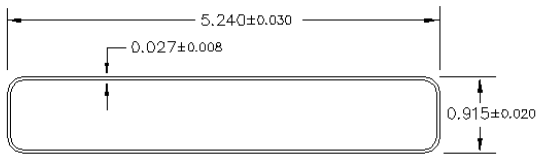
Rhino Composite Groove



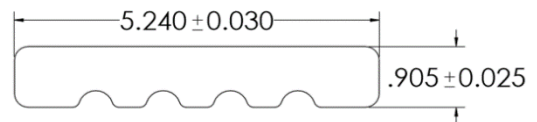
Armadillo Heritage Groove



Armadillo Lifestyle Groove and Evolution Groove

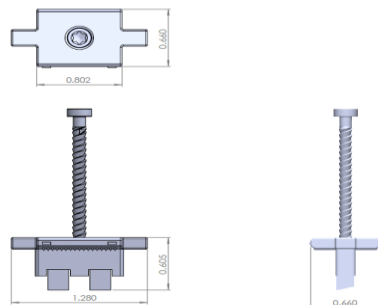


Armadillo Heritage Solid

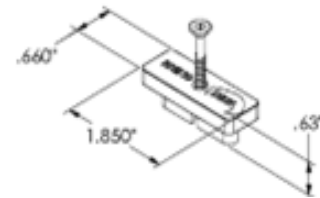


Armadillo Lifestyle Solid and Evolution Solid

FIGURE 1—AVON PLASTICS DECK COMPOSITE DECK BOARDS



Turboclip Universal Hidden Clip



Rhino Vision Clip

FIGURE 2—HIDDEN FASTENING SYSTEMS

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 50 00—Structural Plastics**  
**Section: 06 53 00—Plastic Decking**  
**Section: 06 63 00—Plastic Railings**

**REPORT HOLDER:**

AVON PLASTICS

**EVALUATION SUBJECT:****RHINO COMPOSITE DECK BOARDS (ALSO KNOWN AS ALL SEASON, WOODLAND, SEASONS, NORTH DEX AND WEST STAR)****ARMADILLO HERITAGE, LIFESTYLE AND EVOLUTION COMPOSITE DECK BOARDS (ALSO KNOWN AS ARMADILLO ESSENTIAL) WITH WEATHERABLE CAP****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Avon Plastics composite deck boards described in ICC-ES evaluation report [ESR-1461](#), have also been evaluated for compliance with the codes noted below as adopted by the Los Angeles Department of Building and Safety (LADBS).

**Applicable code editions:**

- 2020 *City of Los Angeles Building Code* (LABC)
- 2020 *City of Los Angeles Residential Code* (LARC)

**2.0 CONCLUSIONS**

The Avon Plastics composite deck boards, described in Sections 2.0 through 7.0 of the evaluation report [ESR-1461](#), comply with the LABC Chapter 26, and the LARC, and are subjected to the conditions of use described in this supplement.

**3.0 CONDITIONS OF USE**

The Avon Plastics composite deck boards, described in this evaluation report must comply with all of the following conditions:

- All applicable sections in the evaluation report [ESR-1461](#).
- The design, installation, conditions of use and labeling are in accordance with the 2018 *International Building Code*® (IBC) provisions noted in the evaluation report [ESR-1461](#).
- The design, installation and inspection are in accordance with additional requirements of LABC Chapter 26.
- Under the LARC, an engineered design in accordance with LARC Section R301.1.3 must be submitted.

This supplement expires concurrently with the evaluation report, reissued March 2024.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES**  
**Section: 06 50 00—Structural Plastics**  
**Section: 06 53 00—Plastic Decking**  
**Section: 06 63 00—Plastic Railings**

**REPORT HOLDER:**

AVON PLASTICS

**EVALUATION SUBJECT:****RHINO COMPOSITE DECK BOARDS (ALSO KNOWN AS ALL SEASON, WOODLAND, SEASONS, NORTH DEX AND WEST STAR)****ARMADILLO HERITAGE, LIFESTYLE AND EVOLUTION COMPOSITE DECK BOARDS (ALSO KNOWN AS ARMADILLO ESSENTIAL) WITH WEATHERABLE CAP****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that Avon Plastics composite deck boards, described in ICC-ES evaluation report ESR-1461, have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2022 and 2019 *California Building Code (CBC)*

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

- 2022 and 2019 *California Residential Code (CRC)*

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

The Avon Plastics composite deck boards, described in Sections 2.0 through 7.0 of the evaluation report ESR-1461, comply with the CBC Chapter 26, provided the design and installation are in accordance with the 2021 or 2018 *International Building Code*® (IBC) provisions noted in the evaluation report.

The products have not been evaluated under Chapter 7A for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

**2.1.1 OSHPD:**

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

**2.1.2 DSA:**

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

**2.2 CRC:**

The Avon Plastics composite deck boards, described in Sections 2.0 through 7.0 of the evaluation report ESR-1461, comply with CRC Chapter 3 and Section R507, provided the design and installation are in accordance with the 2021 or 2018 *International Residential Code*® (IRC) provisions noted in the evaluation report.

The products have not been evaluated under CRC Section R337 for use in the exterior design and construction of new buildings located in a Fire Hazard Severity Zone within State Responsibility Areas or any Wildland–Urban Interface Fire Area.

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

This supplement expires concurrently with the evaluation report, reissued March 2024.

**DIVISION: 06 00 00—WOOD, PLASTICS AND COMPOSITES****Section: 06 50 00—Structural Plastics****Section: 06 53 00—Plastic Decking****Section: 06 63 00—Plastic Railings****REPORT HOLDER:****AVON PLASTICS****EVALUATION SUBJECT:****RHINO COMPOSITE DECK BOARDS (ALSO KNOWN AS ALL SEASON, WOODLAND, SEASONS, NORTH DEX AND WEST STAR)****ARMADILLO HERITAGE, LIFESTYLE AND EVOLUTION COMPOSITE DECK BOARDS (ALSO KNOWN AS ARMADILLO ESSENTIAL) WITH WEATHERABLE CAP****1.0 REPORT PURPOSE AND SCOPE****Purpose:**

The purpose of this evaluation report supplement is to indicate that the Avon Plastics composite deck boards described in ICC-ES evaluation report ESR-1461 have also been evaluated for compliance with the codes noted below.

**Applicable code editions:**

- 2020 *Florida Building Code—Building*
- 2020 *Florida Building Code—Residential*

**2.0 CONCLUSIONS**

The Avon Plastics composite deck boards described in Sections 2.0 through 7.0 of the evaluation report ESR-1461 comply with the *Florida Building Code—Building* and the *Florida Building Code—Residential*. The design requirements must be determined in accordance with the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable. The installation requirements noted in the ICC-ES evaluation report ESR-1461 for the 2018 *International Building Code*® meet the requirements of the *Florida Building Code—Building* and the *Florida Building Code—Residential*, as applicable.

Use of the Avon Plastics composite deck boards for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building* and the *Florida Building Code—Residential* has not been evaluated and is outside the scope of this evaluation report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued March 2024.