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ESR-1657

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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:

HOMELAND VINYL PRODUCTS, INC.

**3300 PINSON VALLEY PARKWAY
BIRMINGHAM, ALABAMA 35217**

EVALUATION SUBJECT:

**GORILLA DECK™ AND RECTANGULAR, NEXUS® T-RAIL, T-RAIL, CONTOUR RAIL,
DECKOVER AND R-RAIL GUARDRAIL SYSTEMS**



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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:
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EVALUATION SUBJECT:
GORILLA DECK™ AND RECTANGULAR, NEXUS® T-RAIL, T-RAIL, CONTOUR RAIL, DECKOVER AND R-RAIL GUARDRAIL SYSTEMS
ADDITIONAL LISTEES:
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 608 QUEEN STREET
 GRIFTON, NORTH CAROLINA 28530

FAIRWAY BUILDING PRODUCTS, L.P.

 53 EBY CHIQUES ROAD
 MT. JOY, PENNSYLVANIA 17552

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 1914 SOUTH GRANT AVENUE
 YORK, NEBRASKA 68467

CAPITAL RAILING, LLC

 1954 HALETHORPE FARMS ROAD, SUITE 100
 HALETHORPE, MARYLAND 21227

VINYL BY DESIGN

 67002 STATE ROAD 15
 NEW PARIS, INDIANA 46553

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)

- 2013 *Abu Dhabi International Building Code* (ADIBC)[†]

[†] The ADIBC is based on the 2009 IBC. 2009 IBC code sections referenced in this report are the same sections in the ADIBC.

Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

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

- 2013 California Green Building Standards Code (CALGreen), Title 24, Part 11
- 2012 and 2008 ICC 700 *National Green Building Standard*™ (ICC 700-2012 and ICC 700-2008)

Attributes verified:

- See Section 3.1

2.0 USES

The Homeland® Vinyl Products, Inc., Gorilla Deck® described in this report is limited to exterior use as a deck board for balconies, porches, stair treads and decks of Type V-B construction (IBC) and other types of construction in applications where untreated wood is permitted by IBC Section 1406.3, or in structures constructed in accordance with the IRC.

The Homeland Vinyl Products, Inc., Rectangular top rail systems (Rectangular and Deckover), Bracketed-T top rail systems (T-Rail and Nexus® T-Rail) and Bracketed-Bread Loaf top rail system (R-Rail and Contour Rail) described in this report are limited to exterior use as guards for balconies, porches, and decks of structures of Type V-B construction (IBC) and other types of construction in applications where untreated wood is permitted by IBC Section 1406.3, or in structures constructed in accordance with the IRC.

3.0 DESCRIPTION
3.1 General:

The Gorilla Deck® and Rectangular, Deckover, T-Rail, Nexus® T-Rail, Contour Rail and R-Rail systems are poly vinyl chloride (PVC) products manufactured by Homeland Vinyl Products, Inc. by an extrusion process in five colors: tan, white, adobe, honey maple and mocha walnut. The products are fabricated and packaged by the additional listees and sold under the product names listed in Table 5.

The attributes of the system components have been verified as conforming to the requirements of (i) 2013 CALGreen Section A5.406.1.2 for reduced maintenance; (ii) ICC 700-2012 Sections 602.1.6 and 11.602.1.6 for termite-resistant materials and 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.

3.2 Deck Board:

3.2.1 General: The Gorilla Deck[®] is manufactured with nominal dimensions of 1¹/₄ by 7 inches, with the actual measurements being 1.25 by 7.02 inches (32 by 180 mm), and is available in typical lengths of 16, 20 and 24 feet (4878, 6096 and 7315 mm). The deck board is fabricated with a profile that is designed to interlock during installation. See Figure 1 for a typical cross section.

3.2.2 Durability: When subjected to weathering, insect attack, and other decaying elements, material used to manufacture the Gorilla Deck[®] is equivalent in durability to preservative-treated or naturally durable lumber when used in locations described in Section 2.0. The Gorilla Deck[®] has been evaluated for structural performance when exposed to a temperature range from -20°F to 125°F (-29°C to 52°C).

3.2.3 Surface-burning Characteristics: When tested in accordance with ASTM E84, the Gorilla Deck[®] has a flame-spread index of no greater than 200.

3.3 Guardrail Systems:

3.3.1 General: The Rectangular, T-Rail, Contour and R-Rail systems are designed for installed heights of 36 and 42 inches (914 mm and 1067 mm) when used in IRC applications and 42 inches (1067 mm) when used in IBC applications with a maximum length of 96 inches (2438 mm) when measured from the edge-of-structure to edge-of-structure. In addition, the T-Rail system may be installed at a height of 42 inches (1067 mm) with a maximum length of 120 inches (3048 mm) when measured from the edge-of-structure to edge-of-structure when used in IRC applications and one- and two-family dwellings constructed under the IBC. The Nexus[®] T-Rail system is designed for an installed height of 42 inches (1067 mm) when used in IBC applications and is designed for installed heights of 36 inches (914 mm) or 42 inches (1067 mm) when used in IRC applications. The Nexus[®] T-Rail system, when constructed under the IBC for other than one- and two-family dwellings, has a maximum length of 96 inches (2438 mm) when measured from the edge-of-structure to edge-of-structure, and 120 inches (3048 mm) when used in IRC applications and one- and two-family dwellings constructed under the IBC. See Figure 2 for typical component cross sections. The Rectangular, T-Rail, Contour Rail and R-Rail systems are comprised of several different types of interchangeable components. These include a Rectangular rail, T-Rail, Contour Rail and R-Rail as top rail components, four different sizes of balusters, a rectangular bottom rail, and various mounting brackets and architectural components as described in the manufacturer's quality control manual. All systems, except Nexus T-Rail, will include either the footblock support mounted mid-span on the bottom rail, or the aluminum "T" insert placed in the bottom rail.

3.3.1.1 Rectangular Rail: The rectangular rail is manufactured with dimensions of 2 by 3¹/₂ inches (51 by 89 mm) and a wall thickness of 0.095 inch (2.4 mm). The rail, when used as a top rail, is designed to be installed with a P-channel insert fabricated from 6063-T6 aluminum alloy. For spans 72 inches (1829 mm) or less, an inverted "h" channel insert fabricated from 6005A-T61 aluminum alloy may be used in IRC applications and one- and two-family dwellings constructed under the IBC. The Rectangular Rail system can also be mounted using Waymark Summit Deckover brackets, which allow for a deck board to be mounted horizontally to the top rail, providing a level surface. The Deckover system requires use of the aluminum "P"-channel insert in all span lengths.

3.3.1.2 T-Rail: The T-Rail is a T-shaped component with a width of 3¹/₂ inches (89 mm), a depth of 3¹/₂ inches (89 mm) and a wall thickness of 0.090 inch (2.3 mm). The T-Rail is designed to be installed with a P-channel insert fabricated from 6063-T6 aluminum alloy when used in IBC applications with spans up to 96 inches (2438 mm) or in IRC applications and one- and two-family dwellings constructed under the IBC with spans of up to 120 inches (3048 mm). An "H" channel fabricated from 6005A-T61 aluminum may be used in IRC applications and one- and two-family dwellings constructed under the IBC with spans up to 96 inches (2438 mm). For spans 72 inches (1829 mm) or less, an inverted "h" channel fabricated from 6005A-T61 aluminum alloy may be used in IRC applications and one- and two-family dwellings constructed under the IBC.

3.3.1.3 R-Rail: The R-Rail is a bread loaf-shaped component with a width of 3 inches (76 mm), a depth of 3¹/₂ inches (89 mm) and a wall thickness of 0.125 inch (3.2 mm). The R-Rail is designed to be installed with a 2.7-by-0.80-inch (69 by 20.3 mm) 6063-T6 aluminum alloy insert.

3.3.1.4 Contour Rail: The Contour Rail is a bread loaf-shaped component with a width of 3 inches (76 mm), a depth of 3¹/₂ inches (89 mm) with a wall thickness of 0.090 inch (2 mm). The Contour Rail, when used as a top rail, is designed to be installed with a P-channel insert fabricated from 6063-T6 aluminum alloy. For spans 72 inches (1829 mm) or less, an inverted "h" channel insert fabricated from 6005A-T61 aluminum alloy may be used in IRC applications and one- and two-family dwellings constructed under the IBC.

3.3.1.5 Nexus[®] T-Rail: The Nexus[®] T-Rail is a tee-shaped component with a width of 3 inches (76 mm), a depth of 1³/₄ inches (44 mm) and a wall thickness of 0.065 inch (1.7 mm). The Nexus[®] T-Rail is designed to be installed with a 1.55-by-2.78-inch (39 by 71 mm), U-profile, 6063-T6 aluminum insert in guard widths up to 8-feet and a T-profile aluminum insert in guard widths up to 10 feet.

3.3.1.6 Balusters: The vinyl balusters are fabricated in three sizes: 1¹/₄ by 1¹/₄ inches (32 by 32 mm) with a wall thickness of 0.07 inch (1.8 mm); 1³/₈ by 1³/₈ inches (35 by 35 mm) with a wall thickness of 0.07 inch (1.8 mm); and 1¹/₂ by 1¹/₂ inches (38 by 38 mm) with a wall thickness of 0.07 inch (1.8 mm). The round aluminum balusters are fabricated from 6063-T5 or 6063-T6 aluminum alloy with a 3/4-inch diameter (19 mm) and a minimum wall thickness of 0.05 inch (1.3 mm), and are painted in various colors.

3.3.1.7 Brackets: The brackets available for use with the T-Rail, Contour and Rectangular rail systems are: the Waymark Summit Brackets (in Rectangular, T-Rail,

Contour Rail and Deckover styles), which are available in rigid PVC and acrylic materials. An aluminum bracket is used for the Nexus[®] T-Rail, and a PVC bracket produced by Homeland Vinyl is used for the R-Rail. Connection details for each bracket and rail component can be found in Table 4.

3.3.2 Durability: When subjected to weathering, insect attack, and other decaying elements, material used to manufacture Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems are equivalent in durability to preservative-treated or naturally durable lumber when used in locations described in Section 2.0. Gorilla Deck[®] has been evaluated for structural performance when exposed to a temperature range from -20°F to 125°F (-29°C to 52°C).

3.3.3 Surface-burning Characteristics: When tested in accordance with ASTM E84, Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems have a flame-spread index of no greater than 200.

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the Gorilla Deck[®], Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems 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.

4.2 Deck Boards:

4.2.1 General: When installing the first board of the Gorilla Deck[®], a starter strip must be installed utilizing a No. 8 by 1¹/₂-inch (38 mm) stainless steel pan head screw at each support. The first board is snapped into the starter strip and fastened in the same manner as the starter strip. Each subsequent board is installed by snapping into the previous board and fastening in the same manner. Fasteners must be installed a minimum of 3/4 inch (19 mm) from the end of each board. Butt joints must be supported with a double joist allowing a gap as recommended by the manufacturer's published installation instructions. The deck boards must not extend past the last support.

4.2.2 Structural: The Gorilla Deck[®], when used as a deck board and installed at a maximum center-to-center spacing of the supporting construction, will have an allowable capacity as prescribed in Table 1. The deck boards, when used as stair treads, are sufficient to resist the code-prescribed concentrated load of 300 lbf (1.33 kN) when installed at a maximum center-to-center spacing as indicated in Table 2.

4.3 Guardrail:

4.3.1 General: The Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems are assembled using a bracketed component assembly. The balusters are installed by insertion into a routed opening. The routed openings are fabricated so that a maximum opening of 3.9 inches (99 mm) between balusters is maintained. One 1¹/₂-by-1¹/₂-inch-square footblock is installed at the midpoint of the bottom rail when the system is installed without the aluminum insert in the bottom rail. When the system is installed with the aluminum insert in the bottom rail, no footblock is required. The bottom rail of the Nexus[®] T-Rail system includes additional reinforcement.

4.3.2 Bracketed Component Assembly: The brackets used to attach the top and bottom rails to structures and the top rail to the bracket must be attached as shown in Table 4. The Rectangular, T-Rail, R-Rail and Contour

systems use a plastic bracket. The Nexus[®] T-Rail system uses an aluminum bracket. The top rail components must be reinforced as described in Sections 3.3.1.1, 3.3.1.2, 3.3.1.3, 3.3.1.4 and 3.3.1.5 respectively.

4.3.3 Structural: The Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems will resist the loads specified in the applicable code when installed at a maximum length as prescribed in Table 3.

5.0 CONDITIONS OF USE

The Gorilla Deck[®] and Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems 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 Gorilla Deck[®] described in this report is limited to exterior use as a deck board for balconies, porches, stair treads and decks of Type V-B construction (IBC) and structures constructed in accordance with the IRC. Deck boards used as stair treads must be installed over a minimum of two spans.
- 5.2** The Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems described in this report are limited to exterior use as guards for balconies, porches, and decks of structures of Type V-B construction (IBC) and other types of construction in applications where untreated wood is permitted by IBC Section 1406.3, or in structures constructed in accordance with the IRC.
- 5.3** Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. Only those fasteners and fastener configurations described in this report have been evaluated for the installation of the Gorilla Deck[®] and Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems. When the manufacturer's published installation instructions differ from this report, this report governs.
- 5.4** The use of the Gorilla Deck[®] as a component of a fire-resistance-rated assembly is outside the scope of this report.
- 5.5** The use of wood posts, with or without post sleeves, is outside the scope of this report.
- 5.6** The compatibility of the fasteners and other metal hardware with the supporting construction, including chemically treated wood, is outside the scope of this report.
- 5.7** Adjustment factors outlined in the AF&PA *National Design Specification* and applicable codes must not apply to the allowable capacity and maximum spans for the Gorilla Deck[®] and Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems.
- 5.8** The Gorilla Deck[®] and Rectangular, Contour, T-Rail, Nexus[®] T-Rail and R-Rail systems must be fastened directly 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.

5.9 The Gorilla Deck® and Rectangular, Contour, T-Rail, Nexus® T-Rail and R-Rail systems are produced in Birmingham, Alabama, under a quality-control program with inspections by ICC Evaluation Service, LLC.

6.0 EVIDENCE SUBMITTED

Data establishing compliance of the guard system with the ICC-ES Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails) (AC174), dated January 2012 (editorially revised December 2014).

7.0 IDENTIFICATION

The Gorilla Deck® described in this report is identified on each package by a label bearing the manufacturer’s name (Homeland Vinyl Products, Inc.); the product name; the date of manufacture; the span ratings for use as a deck

board and stair tread; and the evaluation report number (ESR-1657).

The Rectangular, Contour, T-Rail, Nexus® T-Rail and R-Rail systems described in this report are identified on each package by a stamp bearing the manufacturer’s name (Homeland Vinyl Products, Inc.); the name of the packaging facility; the product name; the allowable span, the date of manufacture; and the evaluation report number (ESR-1657).

TABLE 1—DECK BOARD SPAN RATING

DECKBOARD	MAXIMUM SPAN (in.)	ALLOWABLE CAPACITY (lbf/ft ²) ²
Gorilla Deck®	24	100

For SI: 1 inch = 25.4mm, 1 lbf/ft² = 47.9 Pa.

¹Maximum span must be measured center-to-center of the supporting construction.

²Maximum allowable capacity has been adjusted for durability. No further increases are permitted.

TABLE 2—MAXIMUM STAIR TREAD SPAN

DECK BOARD	SPAN CONDITION	MAXIMUM SPAN (in.) ^{1, 2}
Gorilla Deck	Two-span	12

¹Maximum span is measured center-to-center perpendicular, of the supporting construction.

²Deck boards are installed at 90° to supporting stringer.

TABLE 3—MAXIMUM GUARDRAIL SPAN²

PRODUCT NAME	APPLICABLE BUILDING CODE ³		MAXIMUM SPAN (ft-in) ¹
	IBC	IRC	
Rectangular Rail	Yes	Yes	8' – 0"
Contour Rail	Yes	Yes	8' – 0"
T-Rail	Yes	Yes	8' – 0"
T-Rail ⁵	Note 4	Yes	10' – 0"
R-Rail	Yes	Yes	8' – 0"
Nexus® T-Rail	Yes	Yes	8' – 0"
Nexus® T-Rail	Note 4	Yes	10' – 0"

For SI: 1 inch = 25.4 mm, 1 ft = 305 mm.

¹Maximum span must be measured from edge-of-structure to edge-of-structure.

²Maximum allowable span has been adjusted for durability. No further increases are permitted.

³Indicates compliance with the respective building codes.

⁴Allowed in one- and two-family dwellings only

⁵The T-Rail must be installed at 42" height and use the Waymark Summit bracket for a 10'-0" maximum span.

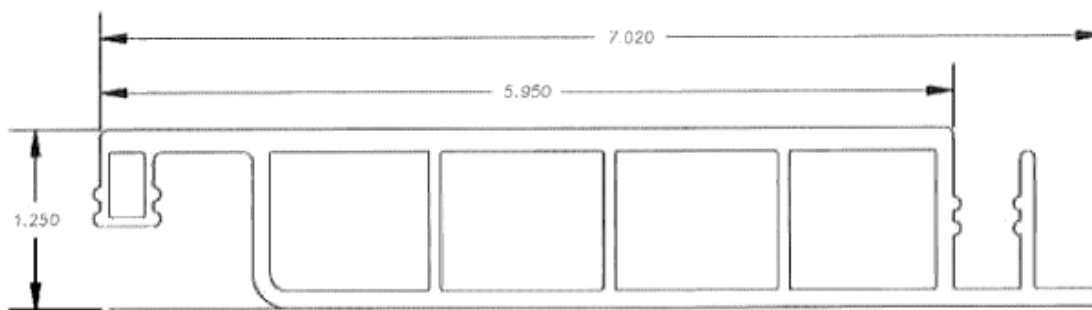
TABLE 4—GUARD FASTENING SCHEDULE

GUARD SYSTEM	BRACKET	CONNECTION	FASTENERS
T-Rail	Waymark Summit	Rail Bracket to Post	Six #10 x 1 1/2 inch Phillips pan-head, stainless steel screw
		Rail Bracket to Rail	Two #10 x 1 inch Phillips pan-head, self-drilling, stainless steel screw
R-Rail	R-Rail PVC Bracket	Rail Bracket to Post	Four # 10 x 2 inch stainless steel wood screws
		Rail Bracket to Rail	Two # 10 x 1 inch stainless steel pan head screws
2 by 3 1/2 (Rectangular)	Waymark Summit (Rectangular or Deckover)	Rail Bracket to Post	Four # 10 x 1 1/2 inch, Phillips pan-head, self-drilling, stainless steel screw
		Rail Bracket to Rail	Two #10 x 1 inch Phillips pan-head, self-drilling, stainless steel screw
Contour Rail	Waymark Summit	Rail Bracket to Post	Six #10 x 1 1/2-inch square-drive, pan-head, self-drilling steel screws
		Rail Bracket to Rail	Two #10 x 1-inch square-drive, pan-head, self-drilling steel screws
Nexus® T-Rail	Nexus Aluminum Bracket	Rail Bracket to Post	Three #8 x 1 5/8-inch, flat-head, #2 square-drive, Type 17 point, stainless steel screws
		Rail Bracket to Rail	Two #10 x 3/4-inch, pan-head, #2 square drive, plated steel, Tek screws

For SI: 1 inch = 25.4 mm.

TABLE 5—LISTEES LOCATIONS AND PRODUCT NAMES

LISTEE	LOCATION	PRODUCT NAME				
		Rectangular Rail	T-Rail	R-Rail	Nexus T-Rail	Contour Rail
Carolina Vinyl Products, Inc.	Grifton, North Carolina	Koala Rail	Grizzly Rail, Kodiak Rail		Polar Rail	Contour Rail
Fairway Building Products, L.P.	Mt. Joy, Pennsylvania York, Nebraska				LandMarke	
Capital Railing, LLC	Halethorpe, Maryland	Lincoln	Washington			
Vinyl By Design	New Paris, Indiana	Birmingham	Birmingham T-Rail			Contour Rail



For SI: 1 inch = 25.4 mm

FIGURE 1—GORILLA DECK® CROSS SECTION

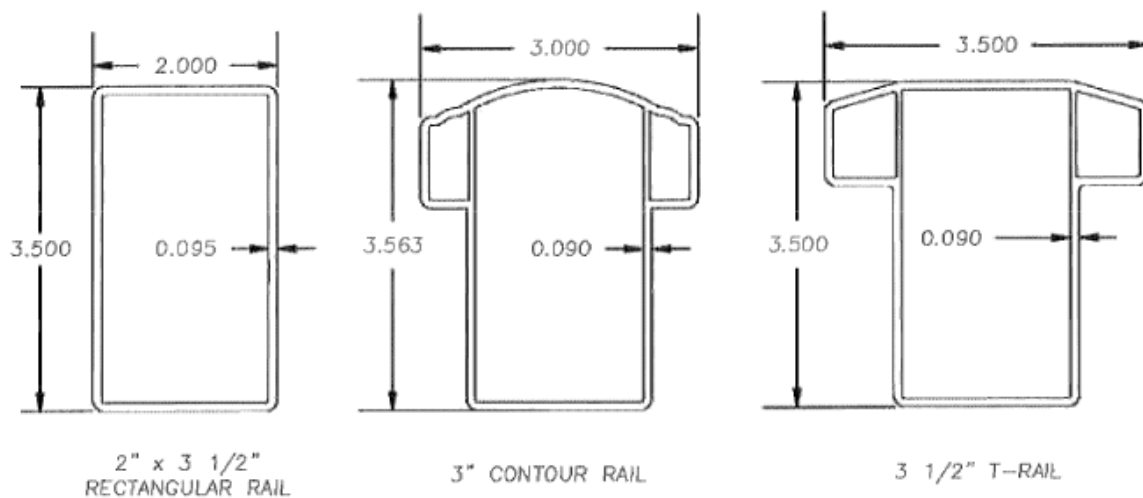


FIGURE 2—GUARDRAIL COMPONENT PROFILES

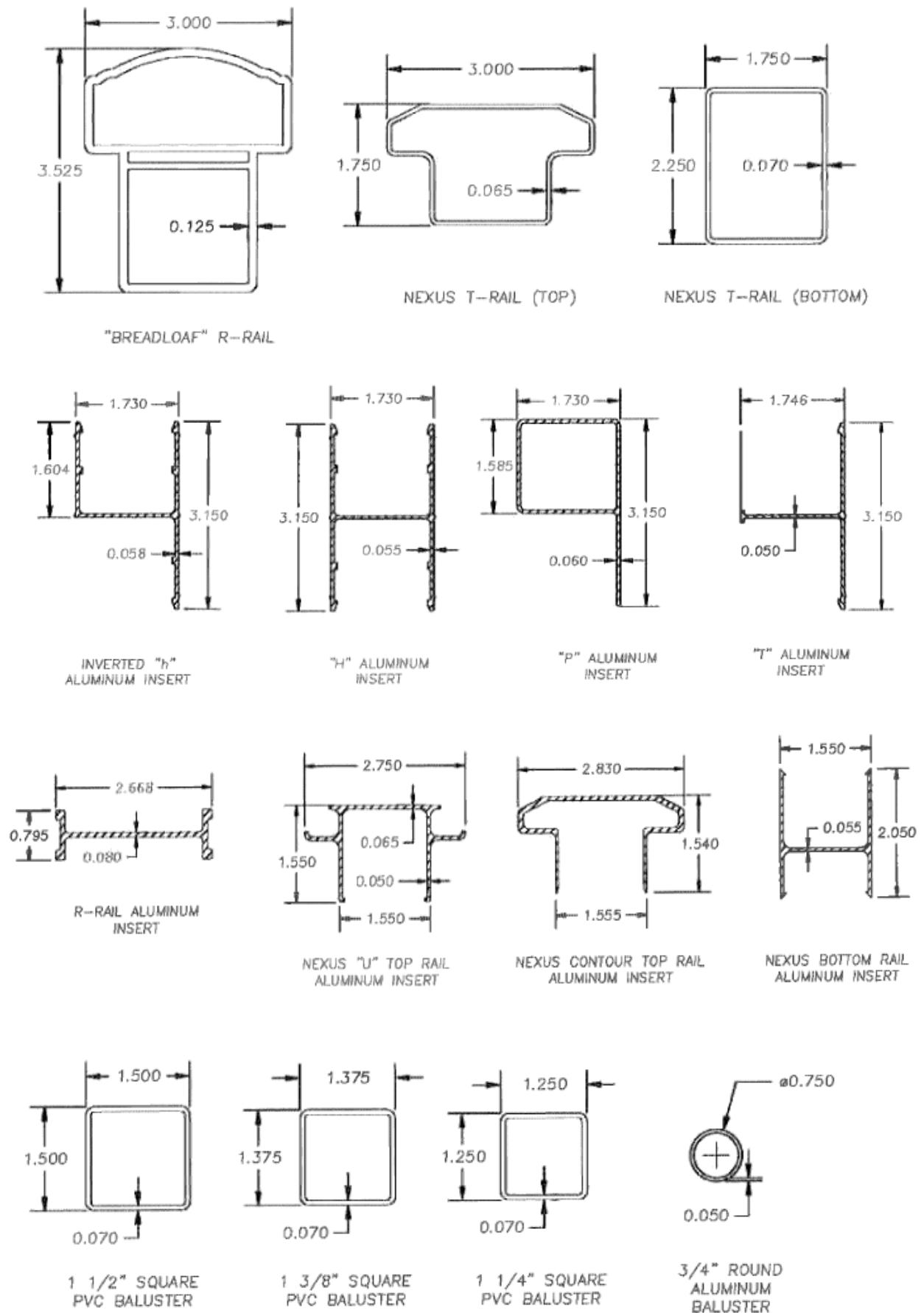


FIGURE 2—GUARDRAIL COMPONENT PROFILES (Continued)