

ICC-ES Evaluation Report


ESR-5222

Reissued August 2024

Subject to renewal March 2025

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<p>DIVISION: 06 00 00— WOOD, PLASTICS AND COMPOSITES</p> <p>Section: 06 50 00— Structural Plastics</p> <p>Section: 06 63 00— Plastics Railings</p>	<p>REPORT HOLDER: WHOLESALE RAILING</p>	<p>EVALUATION SUBJECT: SHEPHERD GUARDRAIL SYSTEM</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, and 2012 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, and 2012 [International Residential Code® \(IRC\)](#)

Properties evaluated:

- Structural
- Durability
- Surface burning characteristics

2.0 USES

The Shepherd guardrail system described in this evaluation report is limited to exterior use as deck boards and guardrails for balconies, porches, and decks of Type V-B construction (IBC) and other types of construction in applications where untreated wood is permitted by 2021 and 2018 IBC Section 705.2.3.1 (2015 and 2012 IBC Section 1406.3), or in structures constructed in accordance with the IRC. The guardrail system has been evaluated by testing for structural strength to meet the design loads and requirements of the IBC and IRC.

3.0 DESCRIPTION

3.1 General:

The Shepherd guardrail system described in this report consists of top and bottom rails with various shapes, hollow pickets having square or round shapes, installation brackets with different shapes, “A”, “P”, “h” and “H” shaped aluminum inserts used as reinforcements for top rails, and installation self-drilling screws with different screws heads. The top and bottom rails; and pickets are co-extruded from rigid polyvinyl chloride (PVC) with a PVC capstock. The guardrail system is available in five colors: White, Adobe, Tan, Mocha or Walnut, as depicted in [Figure 1](#). [Figures 2](#) through [4](#) depict the guardrail components, inserts, and component materials. [Tables 1](#) through [3](#) list the Shepherd guardrail system with the code limitations and the fastening requirements, respectively.

The guardrail system complies with the requirements of ASTM D7032.

3.2 Durability: When subjected to weathering, insect attack, and other decaying elements, materials used to manufacture guardrail system are equivalent in durability to preservative-treated or naturally durable lumber

when used in locations described in Section 2.0. The guardrail system has been evaluated for structural performance when exposed to temperatures from -20°F (-29°C) to 125°F (52°C).

3.3 Surface-burning Characteristics: When tested in accordance with ASTM E84, the guardrail system has a flame-spread index of no greater than 200.

4.0 INSTALLATION

Installation of Shepherd guardrail system 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.

5.0 CONDITIONS OF USE:

The Shepherd guardrail system described in this report complies with, or is a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Installation must comply with this evaluation report, the manufacturer's published installation instructions and the applicable code. A copy of the manufacturer's published installation instructions shall be available at the jobsite at all times. When the manufacturer's published installation instructions differ from this report, this report governs.
- 5.2 The guardrail system described in this evaluation report is 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 2021 and 2018 IBC Section 705.2.3.1 (2015 and 2012 IBC Section 1406.3), or in structures constructed in accordance with the IRC.
- 5.3 All framing, wood posts, beams, joists, stringers and associated connections required to anchor the railing posts are outside the scope of this report. All framing shall follow applicable codes or be designed by a licensed Engineer. Stairway handrails shall be designed and constructed in accordance with the applicable codes.
- 5.4 Only those fasteners and fastener configurations described in this report have been evaluated for the installation of the guardrail systems.
- 5.5 The guardrail system described in this report was load tests by using nominally 4x4 (88.9 mm x 88.9 mm) Douglas Fir or 4x4 (88.9 mm x 88.9 mm) treated Southern Pine posts. Where other lumber species are utilized, the fastener capacity shall be verified by the code official or a registered design professional, as applicable.
- 5.6 The guardrails system described in this report has been evaluated to the design rating and requirements of [Table 1](#) of this report.
- 5.7 The guardrails system is manufactured at facilities located in Birmingham, Alabama and Surgoinsville, Tennessee under an approved 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 April 2021).

7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-5222) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.
- 7.2 In addition, the Shepherd guardrail system described in this report is identified on each package by a label bearing the report holder's name (Wholesale Railing); the product name; the allowable span; and the date of manufacture.
- 7.3 The report holder's contact information is the following:

WHOLESALE RAILING
899 CORKERY LANE
WILLIAMSTOWN, NEW JERSEY 08094
(856) 443-2484
www.wholesalerailing.com
wholesalerailing@gmail.com

TABLE 1—SHEPHERD GUARDRAIL SYSTEMS AND CODE LIMITATIONS^{4,5,6,7}

GUARDRAIL SYSTEM	INSERT	GUARDRAIL SPAN (ft.)	MAXIMUM HEIGHT (in.)	APPLICABLE CODE
SHEPHERD I T-Rail with Polymer Bracket	SHEPHERD I T-Rail Aluminum Insert	6 8	42	IRC ^{1,2}
SHEPHERD I T-Rail with Aluminum Brackets	SHEPHERD I T-Rail Aluminum Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD I T-Rail with Aluminum Brackets	SHEPHERD I T-Rail (10-ft) Aluminum	10	42	IRC ^{1,2}
SHEPHERD I T-Rail with Polymer & PVC Brackets	SHEPHERD I T-Rail Aluminum Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD I T-Rail with Aluminum & PVC Brackets	SHEPHERD I T-Rail Aluminum Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II Contour with Polymer Brackets	SHEPHERD II "A" Insert	6 8	42	IRC ^{1,2}
SHEPHERD II Contour with Aluminum Brackets	SHEPHERD II Contour Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II Contour with Polymer & PVC Brackets	SHEPHERD II Contour Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II Contour with Aluminum & PVC Brackets	SHEPHERD II Contour Insert	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD 2 x 3-1/2" Rectangular Rail with PVC Brackets	SHEPHERD "H", "P"	6 8	42	IRC ^{1,2}
SHEPHERD Low-Profile Rectangular Rail with Polymer Brackets	SHEPHERD Low Profile	6	42	IRC ^{1,2}

For SI: 1 in. = 25.4 mm and 1 ft. = 304.8 mm

¹ All guardrail systems have been tested at the maximum height noted in the above table, measuring from walking surface to top surface of top rail, and the maximum spans. A guardrail system less than 42 inches in height may be installed at the same tabulated maximum spans, as long as the local code requirements for guardrail heights are met.

² Applicable to One and Two-Family Dwellings in the IRC.

³ Applicable to all Use Groups under the IBC.

⁴ The top rail inserts for SHEPHERD I T-Rail are manufactured from 6005A-T61 aluminum alloy. See Figures starting on page 4 for profile details.

⁵ The top rail inserts for SHEPHERD II are manufactured from 6005A-T61 aluminum alloy. See Figures starting on page 4 for profile details.

⁶ The installation brackets for SHEPHERD guardrail systems are manufactured from either aluminum, polyethylene or PVC materials.

⁷ The "P" or Inverted "h" aluminum inserts shall be oriented the long leg of the "P" or the Inverted "h" towards the walking surface.

TABLE 2— GUARDRAIL SYSTEMS AND CODE LIMITATIONS^{4,5,6,7}

GUARDRAIL SYSTEM	INSERT	GUARDRAIL SPAN (ft.)	MAXIMUM HEIGHT (in.)	APPLICABLE CODE
SHEPHERD 3 1/2" T-Rail	Inverted "h"	6	42	IRC ^{1,2}
SHEPHERD 3 1/2" T-Rail	H,P	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD 3 1/2" T-Rail	P	10	42	IRC ^{1,2}
SHEPHERD 2" x 3 1/2" Rectangular	Inverted "h"	6	42	IRC ^{1,2}
SHEPHERD 2" x 3 1/2" Rectangular	P	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD 2" x 3 1/2" Deck-Over	Inverted "h"	6	42	IRC ^{1,2}
SHEPHERD 2" x 3 1/2" Deck-Over	P	6 8	42	IRC ^{1,2} & IBC ³ Codes
SHEPHERD 3" Contour	Inverted "h"	6	42	IRC ^{1,2}
SHEPHERD 3" Contour	P	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II 3 1/2" T-Rail	H,P	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II 3 1/2" T-Rail	Inverted "h"	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II 3 1/2" T-Rail	A	10	42	IRC ^{1,2}
SHEPHERD II 2" x 3 1/2" Rectangular	H,P	6 8	42	IRC ^{1,2} & IBC ³
SHEPHERD II 2" x 3 1/2" Rectangular	Inverted "h"	6 8	42	IRC ^{1,2} & IBC ³

For SI: 1 in. = 25.4 mm and 1 ft. = 304.8 mm

¹ All guardrail systems have been tested at the maximum height noted in the above table, measuring from walking surface to top surface of top rail, and the maximum spans. A guardrail system less than 42 inches in height may be installed at the same maximum span as long as the local code requirements for guardrail heights are met.

² Applicable to One and Two-Family Dwellings in the IRC.

³ Applicable to all Use Groups under the IBC.

⁴ The top rail inserts for SHEPHERD I T-Rail are manufactured from 6005A-T61 aluminum alloy. See Figures starting on page 4 for profile details.

⁵ The top rail inserts for SHEPHERD II are manufactured from 6005A-T61 aluminum alloy. See Figures starting on page 4 for profile details.

⁶ The installation brackets for SHEPHERD guardrail systems are manufactured from either aluminum, polyethylene or PVC materials.

⁷ The "P" or Inverted "h" aluminum inserts shall be oriented the long leg of the "P" or the Inverted "h" towards the walking surface.

TABLE 3—GUARDRAIL FASTENING REQUIREMENTS¹

GUARDRAIL PROFILE	CONNECTION	BRACKET	FASTENER ²	QUANTITY
SHEPHERD I T-Rail	Top/Bottom Brackets to Post	SHEPHERD Polymer Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	12
	Bracket to Top Guardrail		No. 9 x 7/8" pan head galvanized steel self-drilling screws	4
	Bracket to Bottom Guardrail		No. 9 x 7/8" pan head galvanized steel self-drilling screws	4
SHEPHERD I T-Rail	Top Rail Brackets to Post	SHEPHERD Aluminum Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	12
	Bottom Rail Bracket to Post		No. 9 x 7/8" pan head galvanized steel self-drilling screws	4
	Bracket to Top Guardrail		No. 9 x 7/8" pan head galvanized steel self-drilling screws	4
SHEPHERD I T-Rail	Top Rail Brackets to Post	SHEPHERD Polymer Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bottom Rail Bracket to Post	SHEPHERD PVC Level Bracket	No. 9 x 1 1/2" flat-head SS self-drilling screws	6
	Bracket to Top Guardrail	SHEPHERD Polymer Bracket	No. 9 x 7/8" pan head galvanized self-drilling screws	4
	Bracket to Bottom Guardrail	SHEPHERD PVC Level Bracket	No. 9 x 7/8" pan head galvanized self-drilling screws	4
SHEPHERD I T-Rail	Top Rail Brackets to Post	SHEPHERD Aluminum Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bottom Rail Brackets to Post	SHEPHERD PVC Level Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bracket to Top Guardrail	SHEPHERD Aluminum Bracket	No. 9 x 7/8" pan head galvanized steel self-drilling screws	2
	Bracket to Bottom Guardrail	SHEPHERD PVC Level Bracket	No. 9 x 7/8" pan head galvanized steel self-drilling screws	2
SHEPHERD II Contour	Top/Bottom Brackets to Post	SHEPHERD Polymer Bracket	No. 8 8 x 1 5/8" flat head, square drive Type 17 point SS Screws	12
	Bracket to Top Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4
	Bracket to Bottom Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4
SHEPHERD II Contour	Top/Bottom Brackets to Post	SHEPHERD Aluminum Bracket	No. 8 8 x 1 5/8" flat head, square drive Type 17 point SS Screws	12
	Bracket to Top Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4
	Bracket to Bottom Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4
SHEPHERD II Contour	Top Rail Brackets to Post	SHEPHERD Polymer Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bottom Rail Bracket to Post	SHEPHERD PVC Level Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bracket to Top Guardrail	SHEPHERD Polymer Bracket	#9 x 7/8" pan-head galvanized steel self-drilling screws	4
	Bracket to Bottom Guardrail	SHEPHERD PVC Level Bracket	#9 x 7/8" pan-head galvanized steel self-drilling screws	4
SHEPHERD II Contour	Top Rail Brackets to Post	SHEPHERD Aluminum Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bottom Rail Bracket to Post	SHEPHERD PVC Level Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	6
	Bracket to Top Guardrail	SHEPHERD Aluminum Bracket	#9 x 7/8" pan-head galvanized steel self-drilling screws	4
	Bracket to Bottom Guardrail	SHEPHERD PVC Level Bracket	#9 x 7/8" pan-head galvanized steel self-drilling screws	4
SHEPHERD 2 x 3 1/2"	Top/Bottom Rail Bracket to Post	SHEPHERD PVC Level Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	12
	Bracket to Top Guardrail		No. 10 x 3/4" pan-head galvanized steel self-drilling screws	4
	Bracket to Bottom Guardrail		No. 10 x 3/4" pan-head galvanized steel self-drilling screws	4
SHEPHERD Low Profile	Top/Bottom Brackets to Post	SHEPHERD Polymer Bracket	No. 8 8 x 1 5/8" flat head, square drive Type 17 point SS Screws	12
	Bracket to Top Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4
	Bracket to Bottom Guardrail		No. 10 16 x 3/4" pan head, No. 2 square drive, self-drilling coated carbon screws	4

For SI: 1 in. = 25.4 mm

¹ Mechanical fasteners are not required to install the crush blocks underneath the bottom rails.

² SS is for Stainless Steel

TABLE 3—GUARDRAIL FASTENING REQUIREMENTS¹ (CONT'D)

GUARDRAIL PROFILE	CONNECTION	BRACKET	FASTENER ²	QUANTITY
SHEPHERD T-Rail	Top Rail Brackets to Post	SHEPHERD T-Rail Bracket	No. 9 x 1 1/2" SS, pan head, square drive, self-drilling screws	12
	Rail Bracket to Rail		No. 10 x 3/4" pan-head, square drive, self-starting screws	4
	Bracket to Top Guardrail	SHEPHERD 2" x 3 1/2" Bracket	No. 9 x 1 1/2" SS, pan head, square drive, self-drilling screws	8
	Bracket to Bottom Guardrail		No. 10 x 3/4" pan-head, square drive, self-starting screws	4
SHEPHERD 2 x 3 1/2"	Top/Bottom Rail Bracket to Post	SHEPHERD 2" x 3 1/2" Bracket	No. 9 x 1 1/2" SS, pan head, square drive, self-drilling screws	16
	Rail Bracket to Rail		No. 10 x 3/4" pan-head, square drive, self-starting screws	8
SHEPHERD Contour	Top Rail Bracket to Post	SHEPHERD Contour Rail Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	12
	Rail Bracket to Rail		No. 10 x 3/4" pan-head, square-drive, self-starting screws	4
	Bottom Rail Bracket to Post	SHEPHERD 2" x 3 1/2" Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	8
	Rail Bracket to Rail		No. 10 x 3/4" pan-head, square-drive, self-starting screws	4
SHEPHERD Deck-Over	Top Rail Bracket to Post	SHEPHERD Deck-Over Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	12
	Rail Bracket to Rail		No. 10 x 3/4" pan-head, square-drive, self-drilling screws	4
	Bottom Rail Bracket to Post	SHEPHERD 2" x 3 1/2" Bracket	No. 9 x 1 1/2" pan-head SS self-drilling screws	8
	Bracket to Bottom Guardrail		#10 x 3/4" pan-head, SS self-drilling screws	4
SHEPHERD II T-Rail	Top Rail Bracket to Post	SHEPHERD II T-Rail Bracket	No. 9 x 1 1/2" pan-head SS thread cutting screws (for use in wood)	12
	Rail Bracket to Rail		No. 10 x 1" pan-head galvanized steel self-drilling screws	4
	Bottom Rail Bracket to Post	SHEPHERD II 2" x 3 1/2" Bracket	No. 9 x 1 1/2" pan-head SS thread cutting screws (for use in wood)	8
	Bracket to Bottom Guardrail		No. 10 x 3/4" pan-head galvanized steel self-drilling screws	4
SHEPHERD II 2 x 3 1/2"	Top/ Bottom Rail Brackets to Post	SHEPHERD II 2" x 3 1/2" Bracket	No. 9 x 1 1/2" flat head SS self-drilling screws	16
	Rail Bracket to Rail		No. 10 x 3/4" pan-head galvanized steel self-drilling screws	8

For SI: 1 in. = 25.4 mm

¹ Mechanical fasteners are not required to install the crush blocks underneath the bottom rails.

² SS is for Stainless Steel



SHEPHERD GUARDRAIL SYSTEMS



SHEPHERD GUARDRAIL SYSTEMS



SHEPHERD II GUARDRAIL SYSTEMS

FIGURE 1—COLORS FOR SHEPHERD GUARDRAIL SYSTEMS

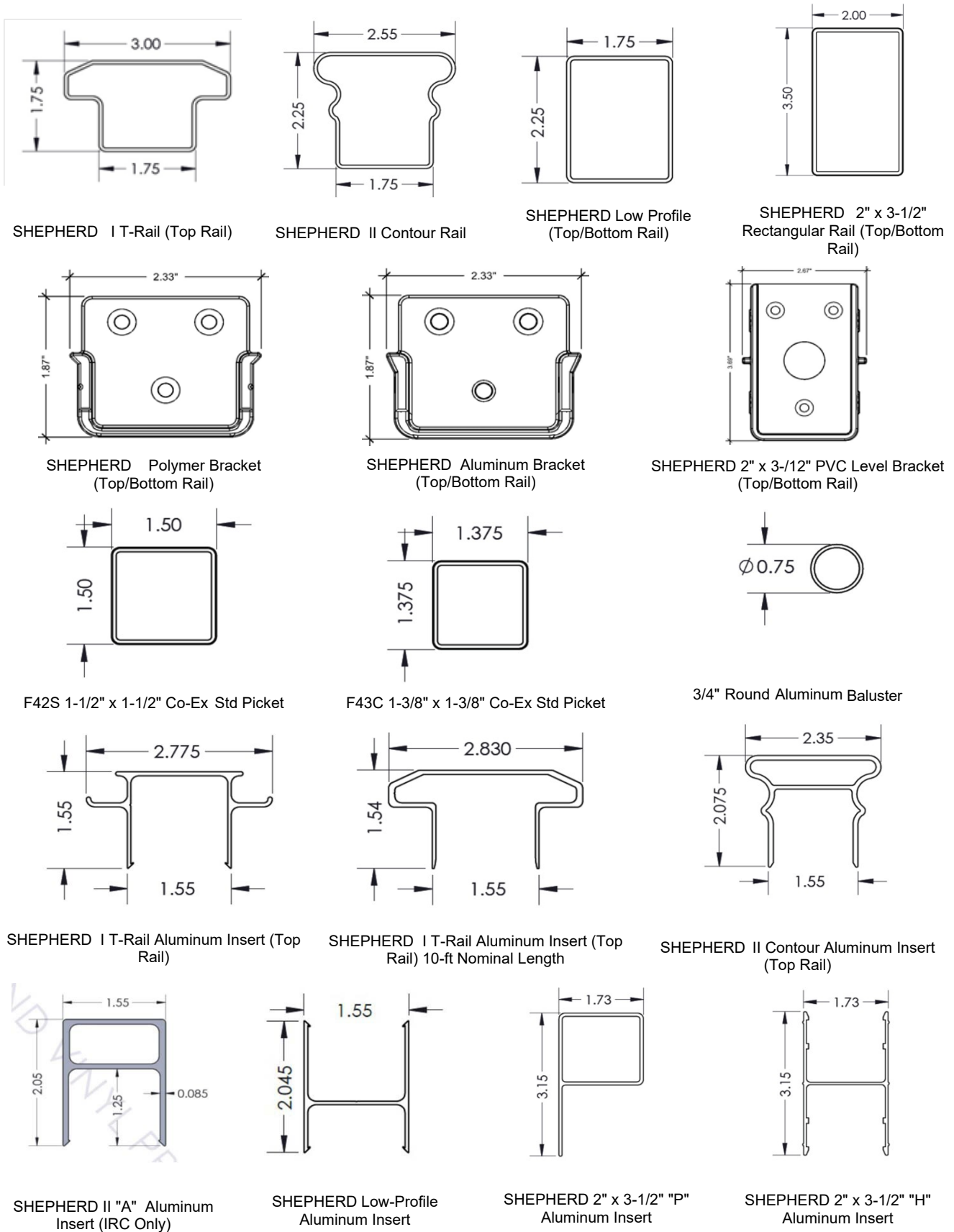
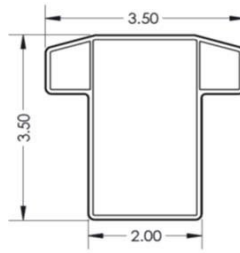


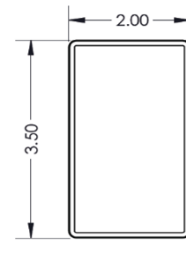
FIGURE 2—SHEPHERD I & II GUARDRAIL SYSTEM COMPONENT PROFILES



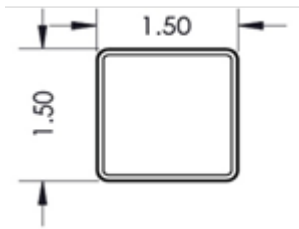
SHEPHERD 3" Contour (Top Rail)



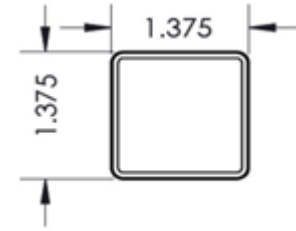
SHEPHERD 3-1/2" T-Rail (Top Rail)



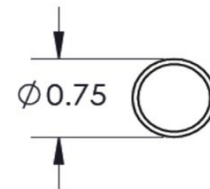
SHEPHERD 2 x 3-1/2" Rectangular Rail (Top/Bottom Rail)



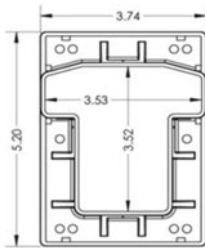
F42C 1-1/2" x 1-1/2" Co-Ex Std. Picket



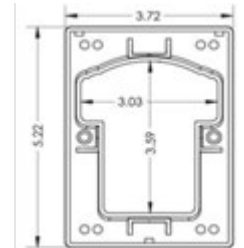
F43C 1-3/8" x 1-3/8" Co-Ex Std. Picket



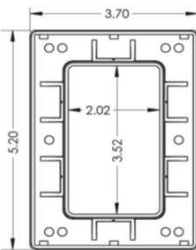
3/4" Round Aluminum Baluster



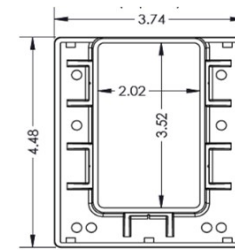
SHEPHERD 3-1/2" T-Rail Bracket



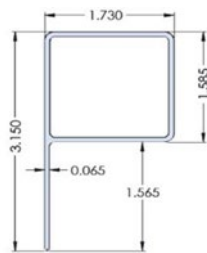
SHEPHERD 3" Contour Bracket



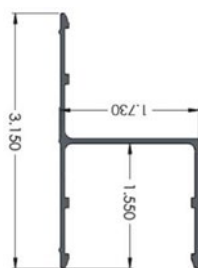
SHEPHERD 2" x 3-1/2" Rectangular Bracket



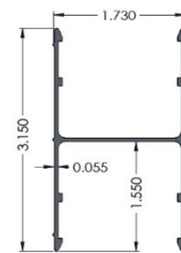
SHEPHERD 2 x 3-1/2" Deck-Over Bracket



SHEPHERD "P" Aluminum Insert (Top Rail)

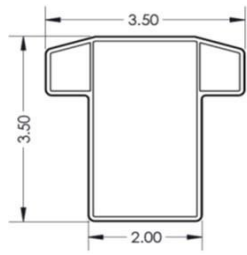


SHEPHERD "h" Aluminum Insert (Top/Bottom Rail)

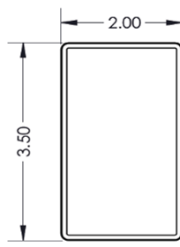


SHEPHERD "H" Aluminum Insert (Top/Bottom Rail)

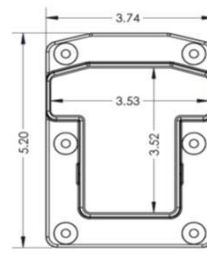
FIGURE 3—SHEPHERD GUARDRAIL SYSTEM COMPONENT PROFILES



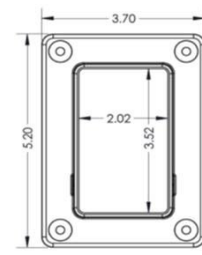
SHEPHERD II 3-1/2" T-Rail
(Top Rail)



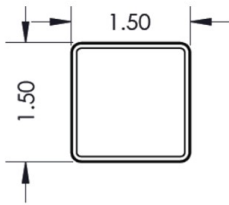
SHEPHERD II 2 x 3-1/2"
Rectangular Rail
(Top/Bottom Rail)



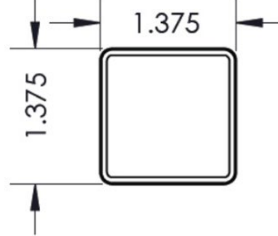
SHEPHERD II 3-1/2" T-Rail
Bracket



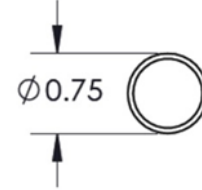
SHEPHERD II 2" x 3-1/2"
Rectangular Bracket



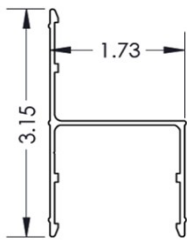
F42C 1-1/2" x 1-1/2" Co-Ex Std. Picket



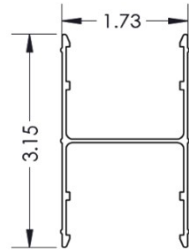
F43C 1-3/8" x 1-3/8" Co-Ex Std. Picket



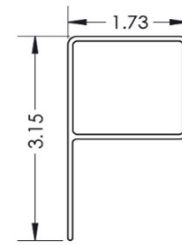
3/4" Round Aluminum Baluster



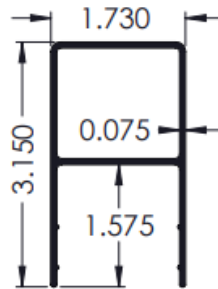
SHEPHERD II "h" Aluminum Insert
(Top/Bottom Rail)



SHEPHERD II "H" Aluminum Insert
(Top/Bottom Rail)



SHEPHERD II "P" Aluminum Insert (Top
Rail)



SHEPHERD II "A" Aluminum Insert
(Top Rail)

FIGURE 4—SHEPHERD II GUARDRAIL SYSTEM COMPONENT PROFILES