



Code Compliance Research Report

CCRR-0125

Subject to Renewal: 02/05/2014
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1.0 Subject

Color Guard Vinyl Railing System

- Classic Series
- Architectural Series
- Madison Series
- Savannah Series

2.0 Research Scope

2.1 Building Codes:

2012 International Building Code (IBC)
2012 International Residential Code (IRC)

2.2 Properties:

Structural Performance
Durability
Surface Burning

3.0 Description

3.1 General – The *Color Guard Vinyl Railing System* is a guardrail under the definitions of the referenced codes. They are intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the codes.

3.2 The *Color Guard Vinyl Railing Systems* are an assemblage of extruded and molded components utilizing Poly Vinyl Chloride (PVC) material produced in the following colors: White, Clay, and Tan.

3.3 The railing systems provide guardrails up to 10 feet (120 inches) in length and a maximum installed height of 42 inches. See Table 1.

3.4 The Classic Series and Architectural Series systems include an extruded PVC top rail measuring 3 inches wide by 1.5 inches high and an extruded PVC bottom rail measuring 3 inches wide by 2 inches high. Aluminum reinforcement is used in both top and bottom rail members. See Figure 1 through Figure 4, Figure 13, and Figure 14.

3.4.1 The Classic Series system utilizes a square, extruded PVC baluster measuring 1.5 inches by 1.5 inches. See Figure 6.

3.4.2 The Architectural Series system utilizes a molded PVC spindle measuring 1.5 inches by 1.5 inches at its ends. See Figure 8.

3.5 The Madison Series and Savannah Series systems include extruded PVC top and bottom rails both measuring 3 inches wide by 2 inches high. Aluminum reinforcement is used in both top and bottom rail members. See Figure 3, Figure 5, Figure 13, and Figure 14.

3.5.1 The Madison Series system utilizes a square, extruded PVC baluster measuring 2 inches by 2 inches. See Figure 7.

3.5.2 The Savannah Series system utilizes a square, extruded PVC baluster measuring 1.5 inches by 1.5 inches. See Figure 6.

3.6 All railing systems utilize an intermediate support block installed between the bottom rail and the deck surface midway between the support posts, a 4 inch by 4 inch extruded PVC post sleeve, and PVC rail-mounting brackets.

3.7 The attachment system is designed for mounting the railing to a post or wall with a PVC straight bracket, which may be adapted for angled conditions by utilizing either a PVC 22-1/2° bracket mounting block or a PVC 45° bracket mounting block as permitted in Table 1 with fastening details as described in Table 2. See Figure 9 through .

4.0 Performance Characteristics

4.1 The railing systems described in this report have demonstrated capacity to resist the design loads specified in Chapter 16 of the IBC and Section R301 of the IRC when tested in accordance with ICC-ES AC174.

4.2 Structural performance has been demonstrated for a temperature range from -20°F to 125°F.

4.3 Materials used are deemed equivalent to preservative treated or naturally durable wood for resistance to weathering effects, decay, and attack from termites.



4.4 PVC materials used have a flame spread index of 20 when tested according to ASTM E 84. The criterion within AC174 requires a flame spread index not exceeding 200 when tested in accordance with ASTM E 84.

5.0 Installation

5.1 Installation of the *Color Guard Vinyl Railing System* must comply with the manufacturer's published installation instructions and this report. Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

5.2 Guardrail assemblies consist of top and bottom rails with pre-routed holes to receive balusters. Full length aluminum reinforcements are inserted in the rails during assembly.

5.3 The maximum installed span of the guard as measured from the inside edge to the inside edge of the post or wall supports shall not exceed the limits given in Table 1 according to the building use classification.

5.4 Molded PVC brackets are utilized to attach top and bottom rails to a PVC-sleeved conventional 4x4 wood post or other suitable supporting structure. Rail brackets are attached to the supports and rails with stainless steel screws in accordance with the fastening schedule shown in Table 2. The wood in the supporting structure shall have a specific gravity of 0.50 or greater (Southern Yellow Pine or better) and a minimum thickness to allow full penetration of the bracket mounting screws.

6.0 Conditions of Use

The *Color Guard Vinyl Railing Systems* identified in this report are deemed to comply with the intent of the provisions of the referenced building codes subject to the following conditions:

6.1 The use of this product is limited to exterior use in buildings as permitted in Table 1.

6.2 Compatibility of fasteners, metal mount components, and other metal hardware with the supporting construction including chemically treated wood is outside the scope of this report.

6.3 Conventional wood supports (posts or walls) for guards are not within the scope of this report and are subject to evaluation and approval by the building official. Supports must satisfy the design load requirements specified in Chapter 16 of the IBC and must provide suitable material for anchorage of the rail brackets. Where required by the building official, engineering calculations and details prepared by a licensed design professional shall be provided.

6.4 The *Color Guard Vinyl Railing System* is produced in Sheboygan Falls, Wisconsin under a quality control program that is inspected by Architectural Testing (IAS AA-676).

7.0 Supporting Evidence

7.1 Drawings and installation instructions submitted by the manufacturer.

7.2 The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ICC-ES AC174, Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails), effective July 1, 2010, and ASTM D 7032-07, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).

7.3 A quality control manual that is in accordance with ICC-ES AC10, Acceptance Criteria for Quality Documentation, effective March 1, 2009.

8.0 Identification

The *Color Guard Vinyl Railing System* produced in accordance with this report shall be identified with labeling on the individual packages that include the following information: product name, manufacturer, the Code Compliance Research Report mark and number (CCRR-0125), and the following statement: "See CCRR-0125 at www.ati-es.com for uses and performance levels." Where applicable, the label shall also include the phrase, "For Use in One- and Two-Family Dwellings Only."

9.0 Code Compliance Research Report Use

9.1 Approval for building products and/or materials can only be granted by a building official having legal authority in the specific jurisdiction where approval is sought.

9.2 Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product or manufacturer by Architectural Testing.

9.3 Reference to the Architectural Testing internet web site address at www.ati-es.com is recommended to ascertain the current version and status of this report.

Table 1 – Maximum Guardrail Spans

System	Type	Maximum Installed Height ²	Code	Maximum Span ¹
Architectural Series and Classic Series	Level	42"	IBC	8'-0"
	Level	36" or 42"	IRC ³	10'-0"
	Level, Angled with 22-1/2° or 45° Bracket Mounting Blocks	36"	IRC	6'-0"
		42"	IBC	6'-0"
Madison Series and Savannah Series	Level	42"	IBC	8'-0"
		36" or 42"	IRC ³	10'-0"

¹ Maximum span is measured from inside to inside of supports (post or wall).

² Railing height is installed height from walking surface to top of top rail.

³ Guardrails with a 42" installed height may also be used under the IBC in the following conditions:

- Detached one- and two-family dwellings and multiple single-family dwellings (townhouses) not more than three stories above grade plane in height with a separate means of egress.
- Use Group R3 adult and child care facilities that are within a single-family home.
- Use Group R4 provided the building is protected by an automatic sprinkler system.

Table 2 – Fastening Schedule

System	Connection	Fastener
Classic Series and Architectural Series	PVC Straight Bracket to PVC-sleeved wood post or PVC Straight Bracket to 22-1/2° or 45° Bracket Mounting Block	Four #10 x 1-1/2 inch self-starting, pan-head screws
	22-1/2° or 45° Bracket Mounting Block to Post	Four #8 x 2-1/2 inch self-starting, pan-head screws
	All PVC brackets to rail ¹	Two #6 x 3/4 inch self-starting, pan-head screws
Madison Series and Savannah Series	PVC Straight Bracket to PVC-sleeved wood post	Four #10 x 1-1/2 inch self-starting, pan-head screws
	PVC Straight bracket to rail ¹	Two #6 x 3/4 inch self-starting, pan-head screws

¹ Fasteners must penetrate the PVC bracket, rail, and aluminum insert.

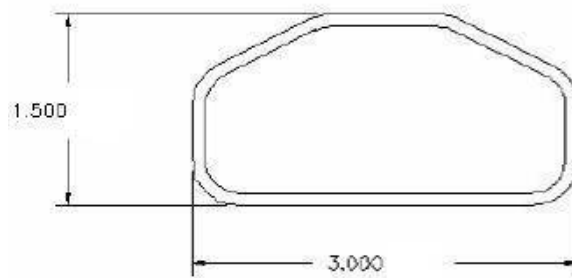


Figure 1 – Classic Series and Architectural Series Top Rail Profile

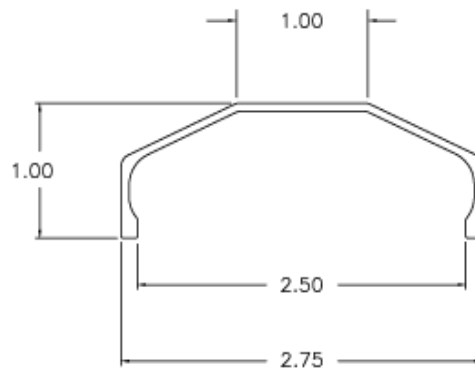
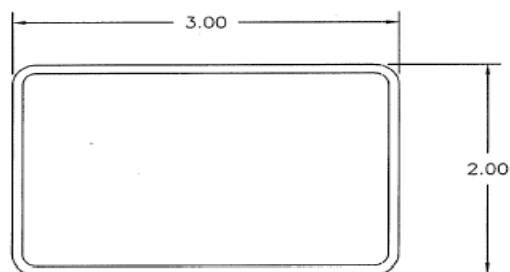


Figure 2 – Classic Series and Architectural Series Top Rail Aluminum Insert



**Figure 3 – Bottom Rail for Classic Series and Architectural Series,
Top and Bottom Rail for Madison Series and Savannah Series**

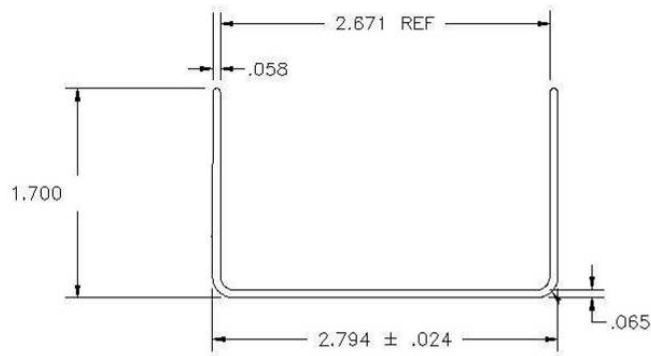


Figure 4 – Classic Series and Architectural Series Bottom Rail Aluminum Insert

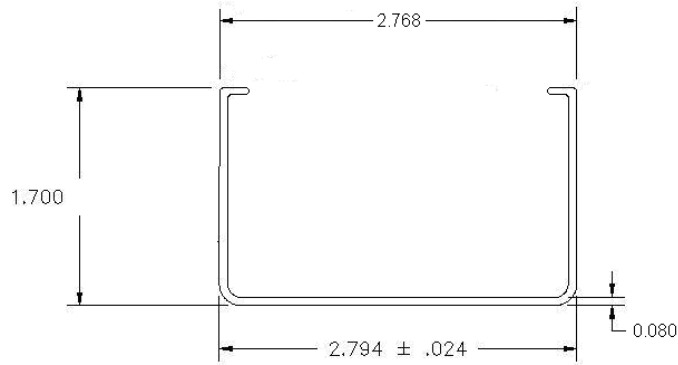
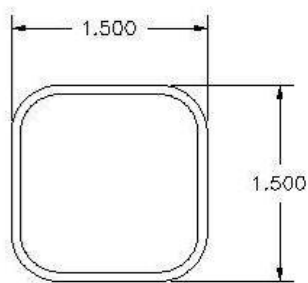
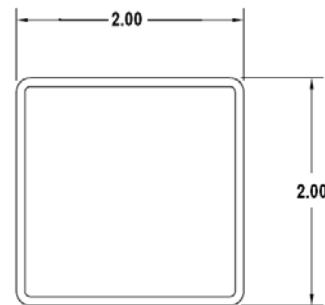


Figure 5 – Madison Series and Savannah Series Top and Bottom Rail Aluminum Insert



**Figure 6 –Baluster Profile:
Architectural Series, Classic Series,
and Savannah Series**



**Figure 7 – Baluster Profile:
Madison Series**

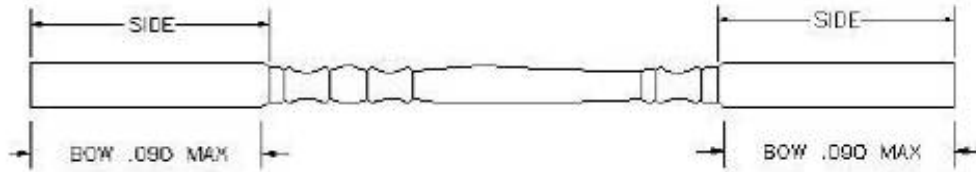


Figure 8 – Architectural Series Spindle

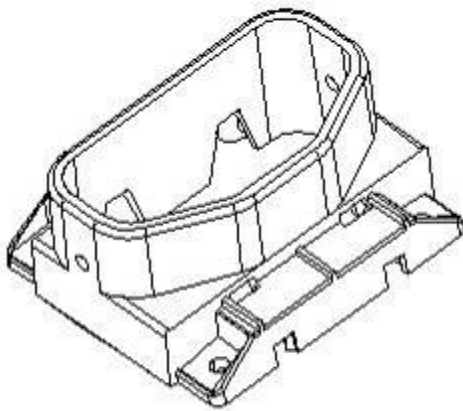


Figure 9 – PVC Straight Bracket for Top Rail of Architectural Series and Classic Series

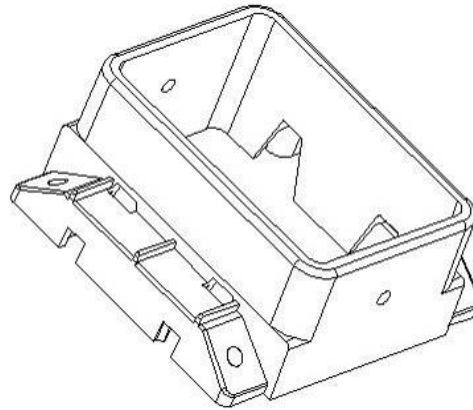


Figure 10 – PVC Straight Bracket for 2" by 3" PVC Rail

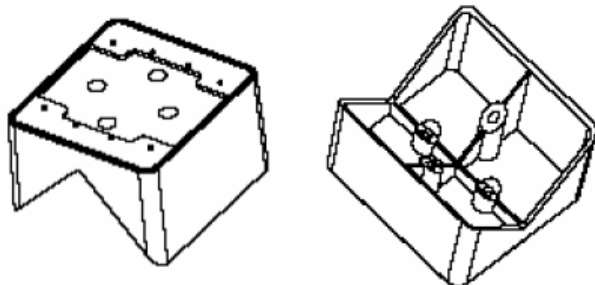


Figure 11 – 45° Bracket Mounting Block

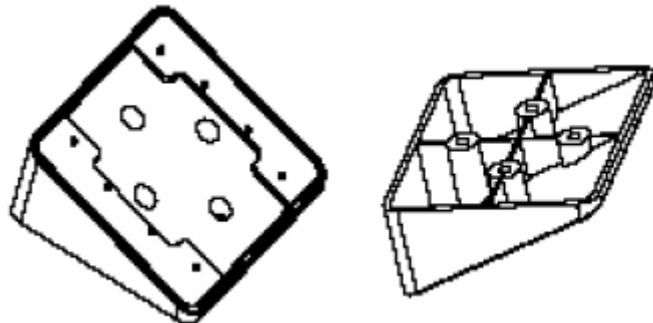


Figure 12 – 22.5° Bracket Mounting Block

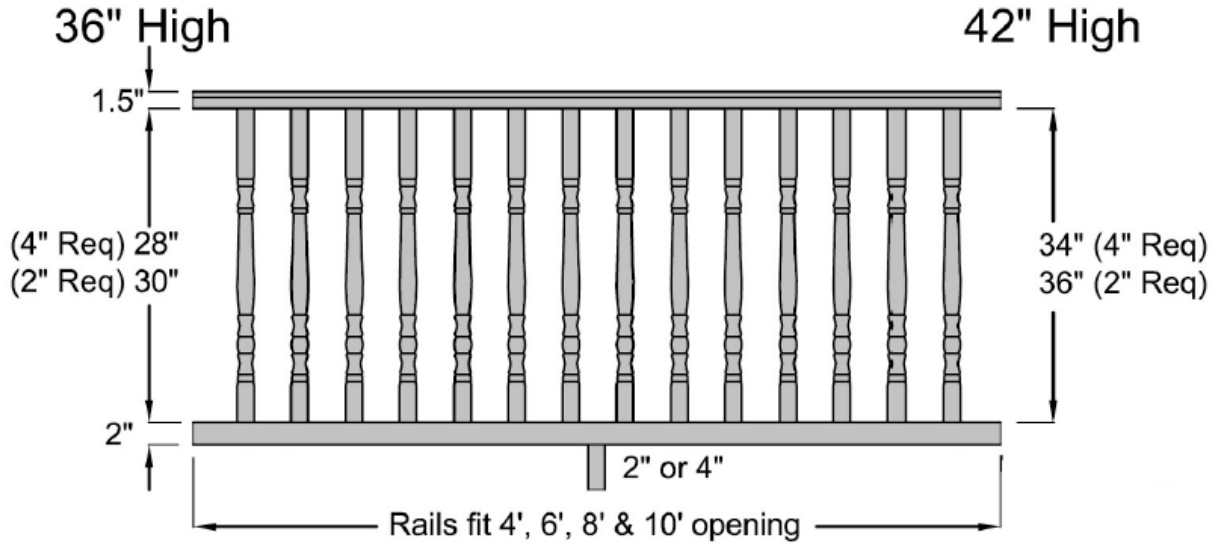


Figure 13 – Architectural Series

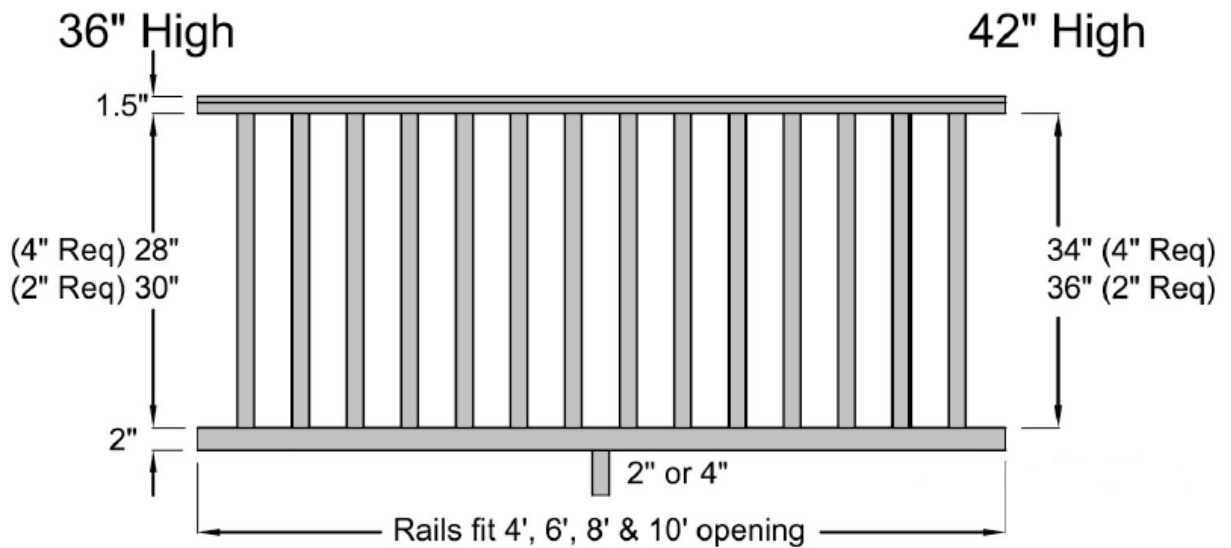


Figure 14 – Classic Series

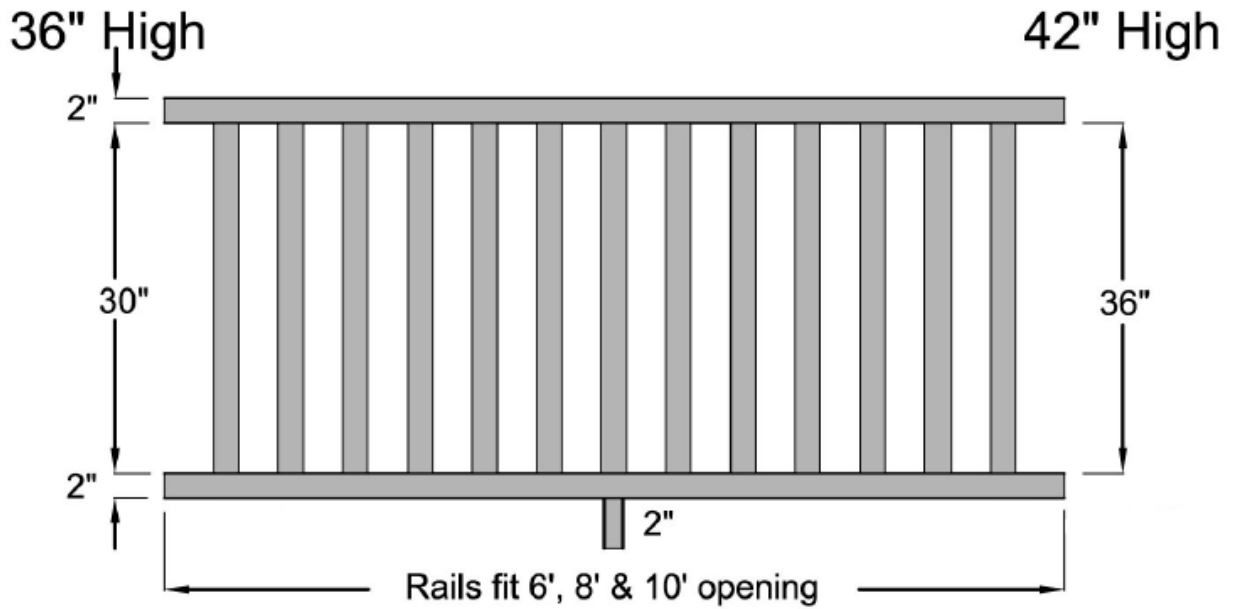


Figure 15 – Madison Series

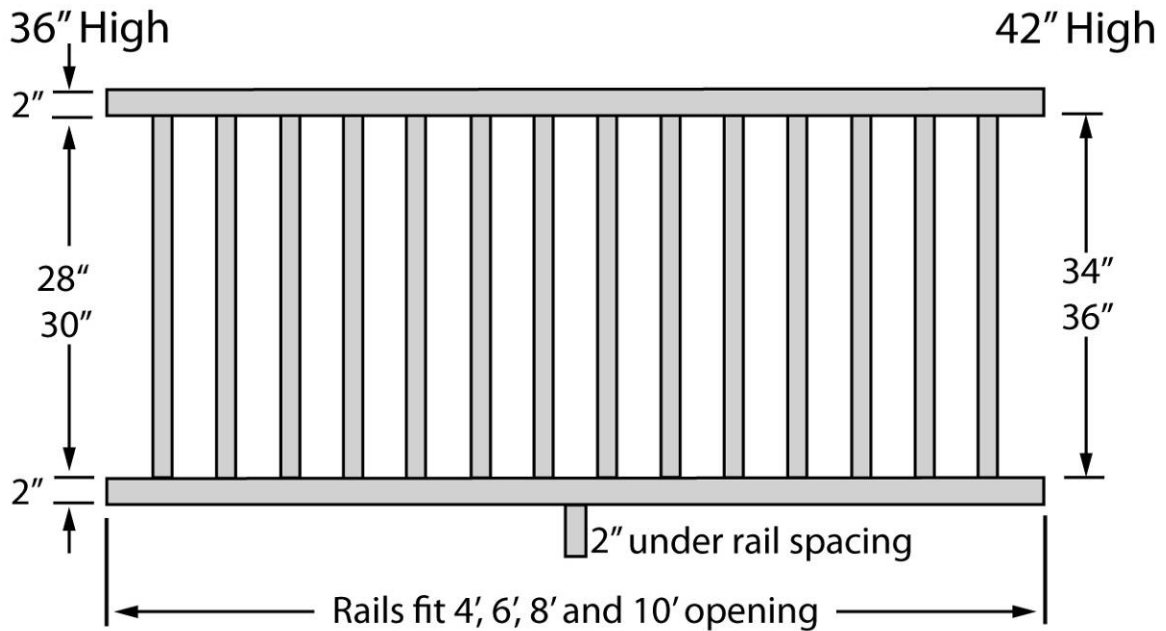


Figure 16 – Savannah Series