



Code Compliance Research Report CCRR-0148

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DIVISION: 06 00 00 – WOOD, PLASTICS, AND COMPOSITES

Section: 06 50 00 – Structural Plastics

Section: 06 63 00 – Plastic Railings

Westech Building Products

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REPORT SUBJECT:

Guardrail Systems

Sentinel®

Reliant®

e-Rail

Quantum Rail

1.0 SCOPE OF EVALUATION

This research report addresses compliance with the following Codes:

- 2012 International Building Code (IBC)
- 2012 International Residential Code (IRC)
- 2014 Florida Building Code (FBC)
(Excluding High Velocity Hurricane Zone)

Westech Guardrail systems have been evaluated for the following properties:

- Structural Performance
- Durability
- Surface Burning
- Decay Resistance
- Termite Resistance

2.0 USES

2.1. The Westech guardrail systems are guards and guardrails 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 referenced codes.

2.2. Guardrail systems are provided as level guards for walking areas such as decks, balconies and

porches, and sloped guards for open sides of stairways. See Table 1 for qualified lengths and configurations.

3.0 DESCRIPTION

3.1. Materials and Processes

3.1.1. Railings are an assemblage of extruded and molded components utilizing Poly Vinyl Chloride (PVC) material and aluminum reinforcements. PVC material is produced in four colors: White, Almond, Clay and Stone.

3.2. The guardrail systems include a top and bottom rail, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings. See Figures 1 through 5 for rail system component drawings.

3.2.1. Structural supports may be conventional wood framing or an LMT *Blu-Mount* Steel Post Mount (See Figure 6) A 4 inch by 4 inch co-extruded PVC post sleeve is utilized with the Steel Post Mount support and may also be used to sleeve a conventional 4x4 wood post.

3.2.1.1. LMT *Blu-Mount* Steel Post Mounts are comprised of a 2 inch square steel tube and welded 5/8 inch thick steel base plate for anchorage. A molded PVC or Aluminum spacer/mounting block provides for attachment of rail brackets. See Figure 6.

4.0 PERFORMANCE CHARACTERISTICS

4.1. The guardrail systems described in this report have demonstrated the capacity to resist the design loadings specified in Chapter 16 of the IBC and FBC, and Section R301 of the IRC when tested in accordance with ICC-ES AC174 and ASTM D 7032.

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. The extruded and molded PVC components have a flame spread index of less than 200 when tested in accordance with ASTM E 84.

5.0 INSTALLATION

Installation shall be in accordance with the manufacturer's installation instructions and this report. Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

5.1. Installation shall be in accordance with the manufacturer's installation instructions and this report. Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

5.2. The *Sentinel*[®], *Reliant*[®], and *e-Rail* level and stair rail systems utilize Nylon mounting brackets to attach the top and bottom rails directly to the structural supports. Zinc die-cast, Zamak 3 brackets are used with the *Quantum Rail* level and stair rail systems. See Table 2 for attachment details.

5.3. The top and bottom guardrails may be attached to either conventional wood supports or a 4x4 PVC post and LMT *Blu-Mount* Steel Post Mount (See Figure 6). Conventional wood supports including wood posts are outside the scope of this report.

5.4. Balusters are installed along the lengths of the upper and lower rail and are secured by insertion into routed openings of the top and bottom rails.

5.5. Foot blocks are utilized for all level railing sections and are installed on the bottom rail between the deck surface and the rail. Installation varies depending on the type of guardrail system installed.

5.6. The wood in the supporting structure including support posts 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.

5.7. The LMT *Blu-Mount* Steel Post Mount is attached to the supporting structure using four (4) 0.375 inch anchoring bolts with flat washers (See Figure 6). The type and length of anchor bolts is dependent upon the material and condition of the supporting structure and is not within the scope of this report.

6.0 SUPPORTING EVIDENCE

6.1. Drawings and installation instructions submitted by the manufacturer.

6.2. 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), revised February 2014.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ASTM D 7032-07, Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).

6.4. Within the scope of this report, the following versions of referenced standards are deemed equivalent:

Standard	Version(s)	
ASTM D7032	07	08
ASTM E84	07	09

6.5. Quality control manual in accordance with ICC-ES AC10, Acceptance Criteria for Quality Documentation, dated June 2014.

7.0 CONDITIONS OF USE

The guardrail assemblies identified in this report are deemed to comply with the intent of the provisions of the referenced building codes subject to the following conditions.

7.1. Guardrails recognized in this report are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC and FBC.

7.2. Conventional wood supports including support posts 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 FBC, and must provide suitable material for anchorage of the rail brackets. Where required by the building official, engineering calculations and details shall be provided.

7.3. Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is not within the scope of this report.

7.4. Anchorage of the Steel Post Mount assemblies are not within the scope of this report and are subject to evaluation and approval by the building official. Anchors must satisfy the design load requirements specified in Chapter 16 of the building code and must meet the following minimum requirements:

7.4.1. A minimum of four anchor bolts must be used and located in the four pre-drilled holes in the post base plate.

7.4.2. The anchors must have a minimum nominal diameter equal to 0.375 inch.

7.4.3. When the supporting structure is a wood-framed deck, installation must include anchorage to suitable structural framing. Decking is not considered structural framing and anchorage to decking alone is not an approved installation method.

7.5. Westech Building Products, Inc. Guardrail Systems are manufactured in Mount Vernon Indiana in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing (AA-676).

8.0 IDENTIFICATION

The guardrail assemblies produced by Westech Building Products, Inc. identified in this report, shall be identified with labeling on the individual components or the packaging and include the following;

8.1.1. Name and/or trademark of the manufacturer and the manufacturers address

8.1.2. The Architectural Testing registered trademark and CCRR number.

8.1.3. The statement "See ATI CCRR-0148 at www.ati-es.com for uses and performance levels."

9.0 CODE COMPLIANCE RESEARCH REPORT USE

9.1. Approval of 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 by Intertek.

9.3. Reference to the Intertek website address at www.ati-es.com is recommended to ascertain the current version and status of this report.

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Table 1 – RAILING SYSTEM BUILDING CODE RECOGNITION

Guardrail System	Guardrail Type Length ¹ x Height ²	Aluminum Rail Reinforcement	Balusters	Posts	Code and Occupancy Classification
<i>Reliant</i> [®] (Figure 2)	96" x 42" Level ³	Top Rail only	1.5" square picket; 1.5" Colonial spindle	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IBC – All Use Groups IRC – One- and Two-Family Dwellings
	94" x 42" Stair				
<i>Sentinel</i> [®] (Figure 3)	96" x 42" Level ³	Top Rail only	1.5" square picket; 1.5" Colonial spindle	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IBC – All Use Groups IRC – One- and Two-Family Dwellings
	94" x 42" Stair				
<i>e-Rail</i> (Figure 4)	96" x 42" Level ⁴	Top Rail Only	1" square baluster	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IBC – All Use Groups IRC – One- and Two-Family Dwellings
	96" x 42" Stair	Top and Bottom Rail			
<i>Quantum Rail</i> (Figure 5)	96" x 42" Level ³	Top Rail only	1.375" square baluster	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IBC – All Use Groups IRC – One- and Two-Family Dwellings
	93-1/4" x 42" Stair	Top and Bottom Rail			

¹ Railing lengths are maximum clear length between supports. Stair railing lengths are measured along the sloping length of the top rail.

² Railing height is the installed height from walking surface to top of top rail. Stair rail heights are measured vertically from the leading edge of the stair tread nose. The installed height for Guardrails regulated by the IRC may be 36" minimum.

³ *Reliant*[®], *Sentinel*[®], and *Quantum Rails* level configurations utilize one foot block located at the mid span of the bottom rail.

⁴ *e-Rail* level configurations greater than four feet in length utilize two foot blocks located at the third points of the bottom rail. *e-Rail* Level configurations with length of four feet or less utilize one foot block at the mid span of the bottom rail.

TABLE 2 – RAIL/BRACKET FASTENING SCHEDULE

Guardrail System	Connection	Fastener
<i>Reliant® and Sentinel®</i>	Bracket to PVC-Sleeved LMT <i>Blu-Mount</i> Post	Four #10 x 1 in x 16 TPI, pan-head, self-drilling, plated steel, sheet metal screws
	Bracket to PVC-Sleeved Wood 4x4	Four #10 x 1-1/2 in x 9-1/2 TPI, pan-head, self-drilling, plated steel, sheet metal screws
	Bracket to Rail	Four #10 x 1 in x 16 TPI, pan-head, self-drilling, plated steel, sheet metal screws (opposing each other on opposite sides of the rail, using the top and bottom slots of the Nylon Post Bracket)
<i>e-Rail</i>	Bracket to PVC-Sleeved Post (LMT <i>Blu-Mount</i> or Wood 4x4)	Four #10 x 1-1/2" (0.185 in. major diameter) pan-head, self-drilling, stainless steel screws
	Bracket to Rail	Four #10 x 1" (0.186 in. major diameter) pan-head, self-drilling, stainless steel screws
	PVC Spacer to LMT <i>Blu-Mount</i> Post	One #10 x 1" (0.187 in. major diameter) pan-head, self-drilling, stainless steel screws
<i>Quantum Rail</i>	Bracket to PVC-Sleeved Post (LMT <i>Blu-Mount</i> or Wood 4x4)	Four #10 x 2" (0.205 in. major diameter) pan-head, stainless steel screws
	Top Rail Bracket to Rail	Two #10 x 1" (0.187 in. major diameter) pan-head, self-driving, stainless steel screws
	Bottom Rail Bracket to Rail (Level)	Four #10 x 1" (0.187 major diameter) pan-head, self-driving, stainless steel screws
	Bottom Rail Bracket to Rail (Stair)	Two #10 x 1" (0.187 major diameter) pan-head, self-driving, stainless steel screws
	Support Block to Bottom Rail	Two #10 x 1" (0.187 major diameter) pan-head, self-driving, stainless steel screws
	PVC Spacer to LMT <i>Blu-Mount</i>	One #10 x 1" (0.187 major diameter) pan-head, self-drilling, stainless steel screws

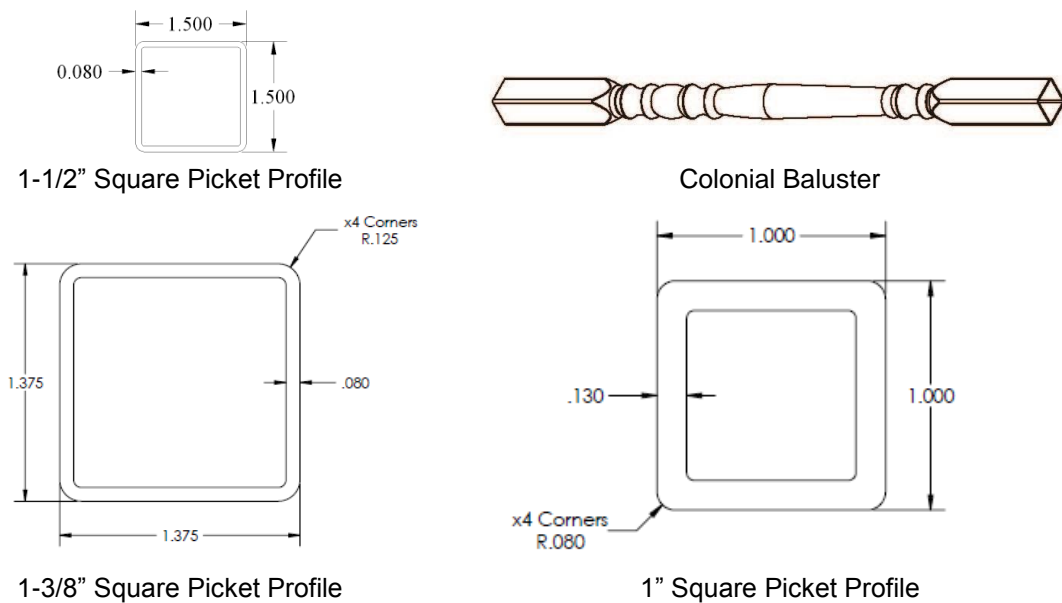


FIGURE 1 – BALUSTERS AND PICKETS

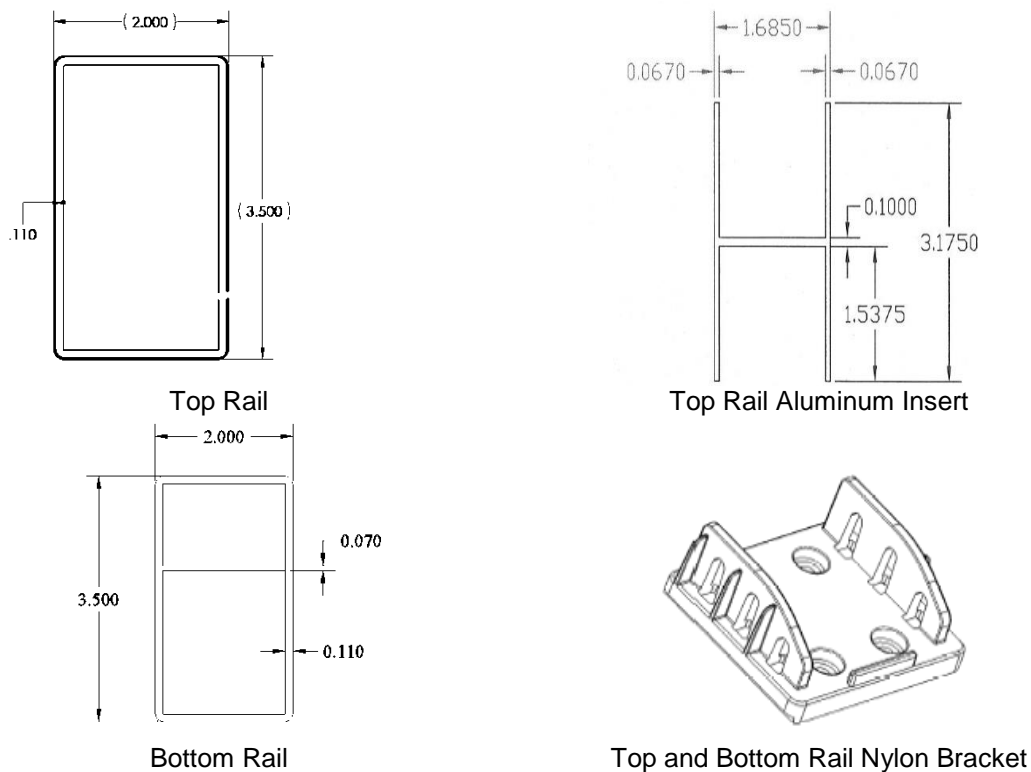


FIGURE 2 – RELIANT® RAIL SYSTEM

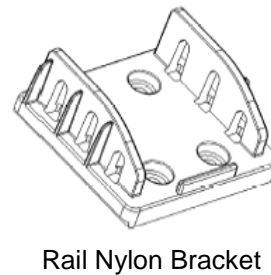
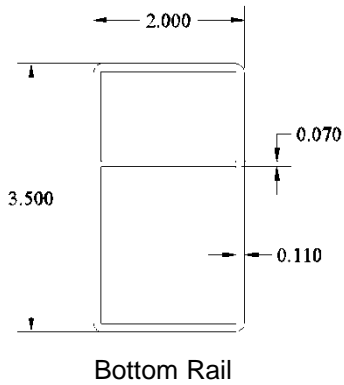
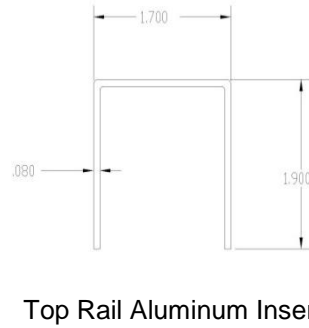
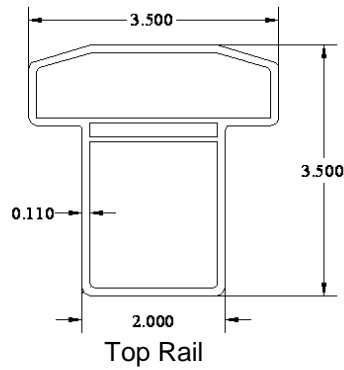


FIGURE 3 – Sentinel® Rail

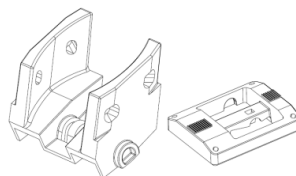
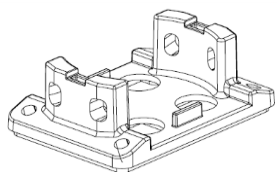
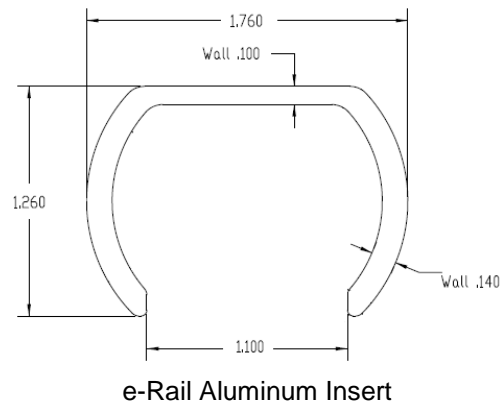
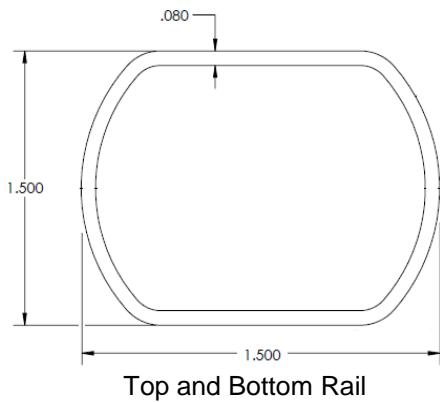
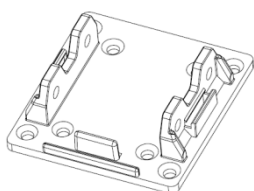
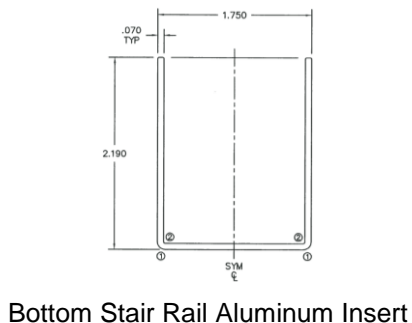
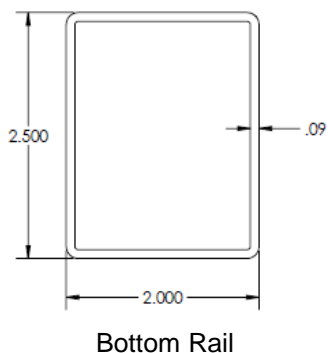
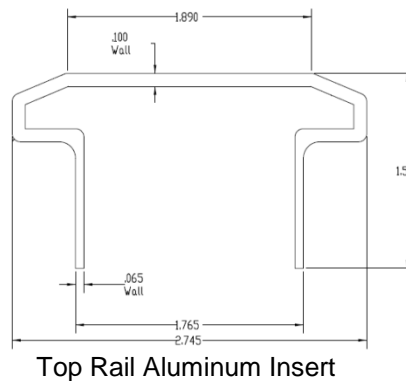
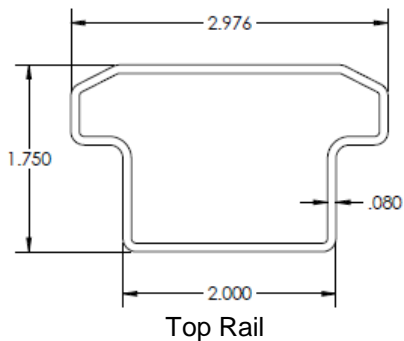
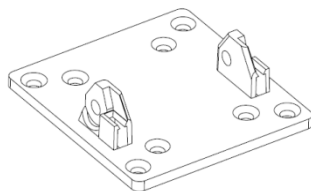


FIGURE 4 – e-RAIL SYSTEM



Bottom Rail Zinc Die-Cast Bracket



Top Rail Zinc Die-Cast Bracket



Foot Block

FIGURE 5 – QUANTUM RAIL SYSTEM

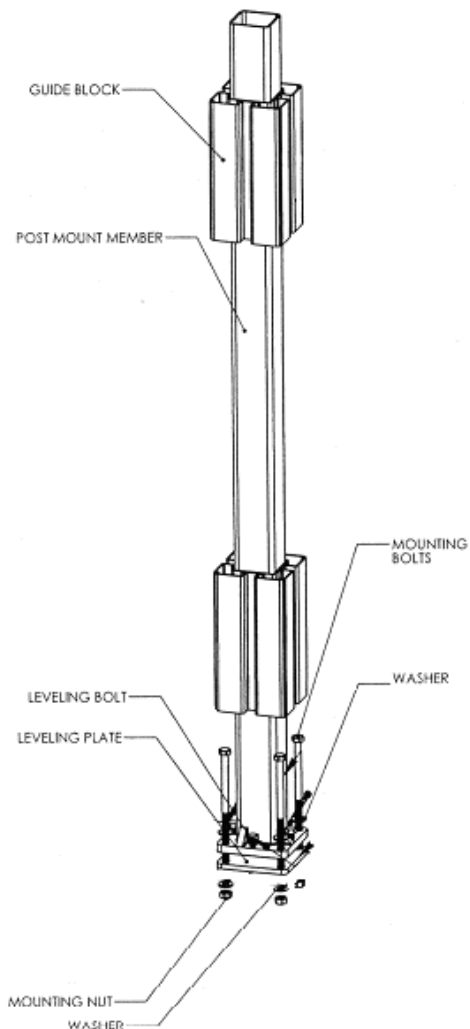


FIGURE 6 – LMT *BLU-MOUNT* W/PVC OR ALUMINUM GUIDES

Note: Supporting structure (wood deck) is not within the scope of this report and must be designed and constructed in accordance with Chapter 16 of the IBC and FBC.

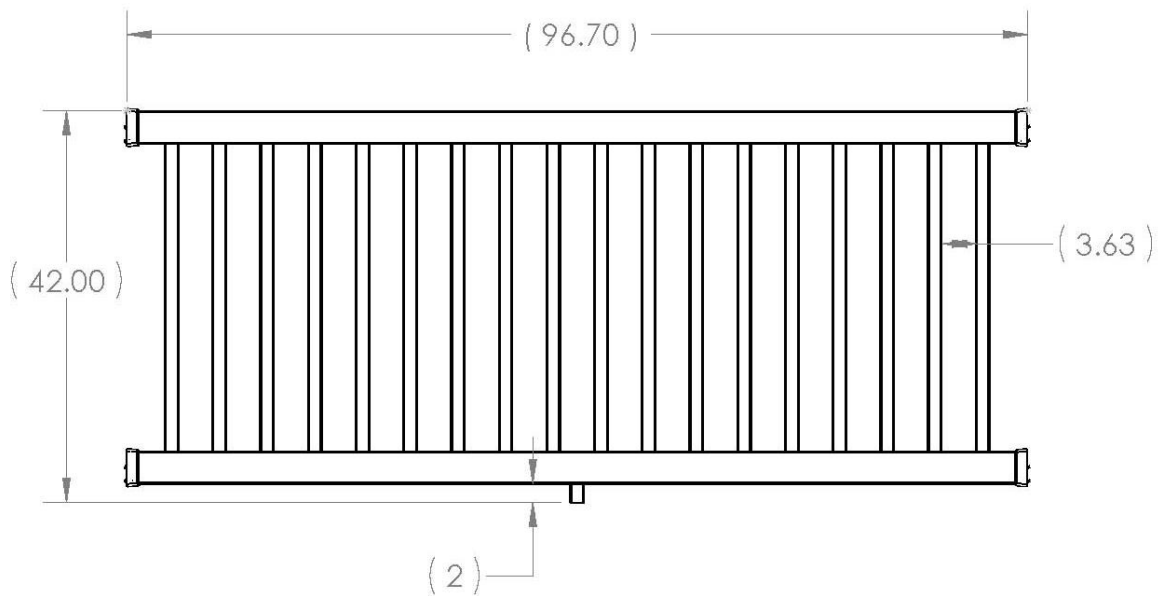


FIGURE 7 – TYPICAL 8' x 42" RELIANT® RAIL KIT SQUARE
(96.70 inches dimension includes length added by brackets)

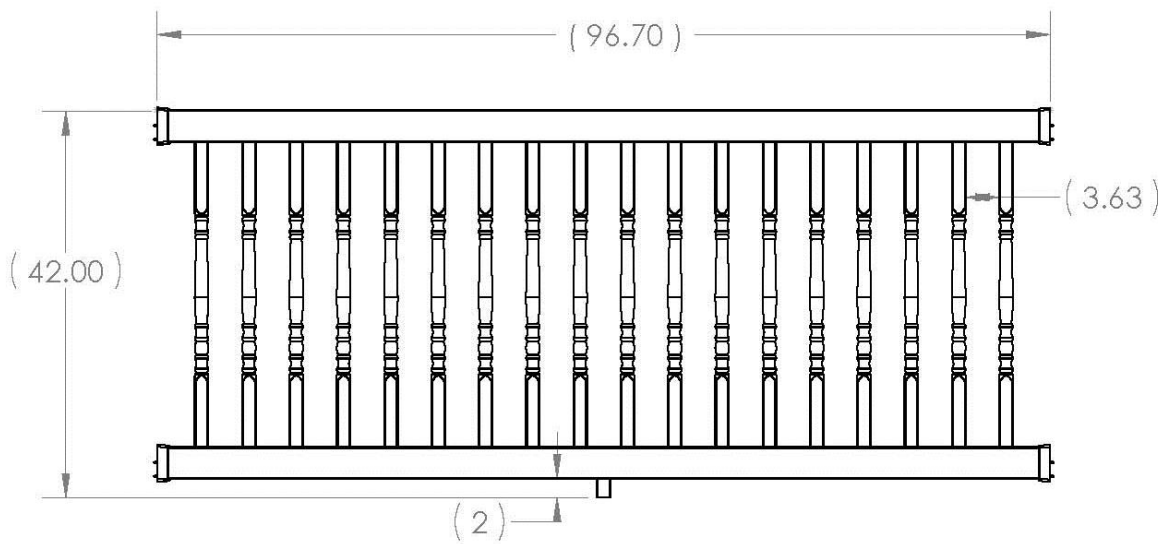


FIGURE 8 – TYPICAL 8' x 42" RELIANT® RAIL KIT COLONIAL
(96.70 inches dimension includes length added by brackets)

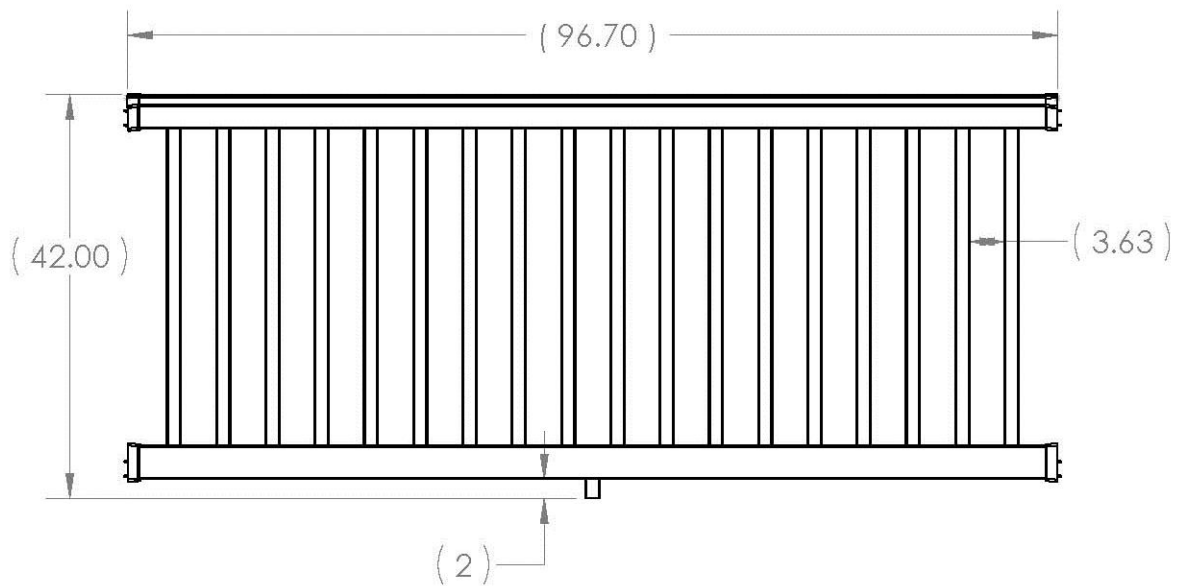


FIGURE 9 – TYPICAL 8' x 42" SENTINEL® RAIL KIT SQUARE

(96.70 inches dimension includes length added by brackets)

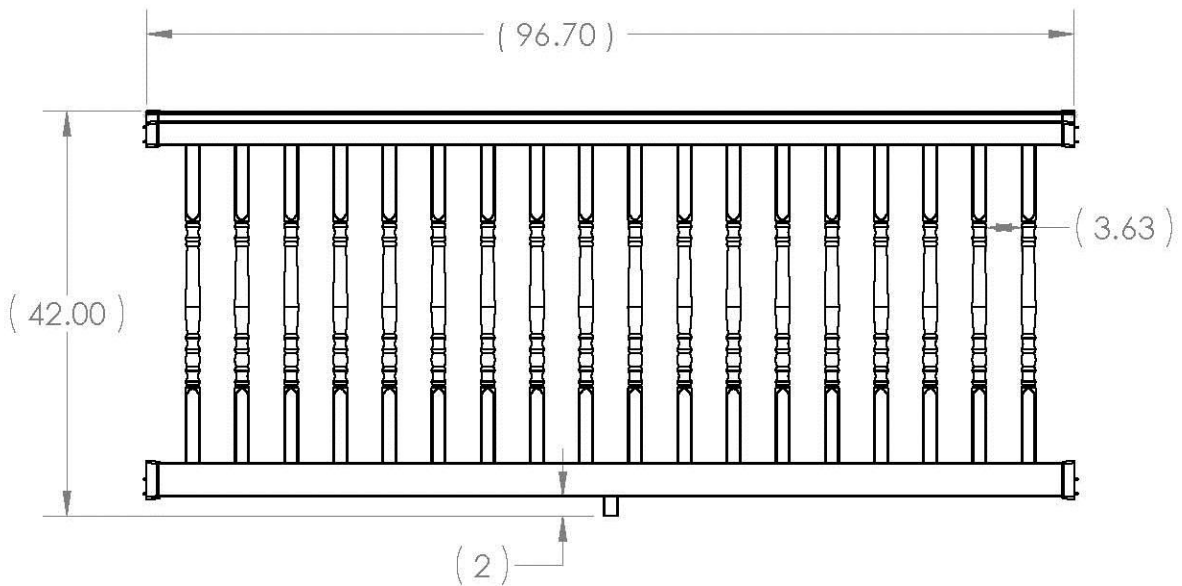


FIGURE 10 – TYPICAL 8' x 42" SENTINEL® RAIL KIT COLONIAL

(96.70 inches dimension includes length added by brackets)

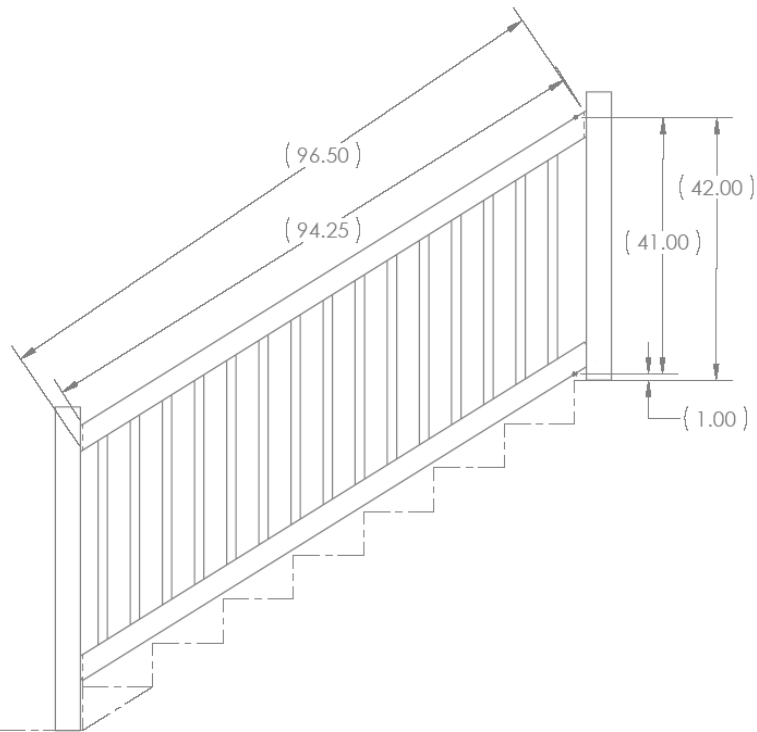


FIGURE 11 – TYPICAL 8' x 42" RELIANT® STAIR KIT SQUARE

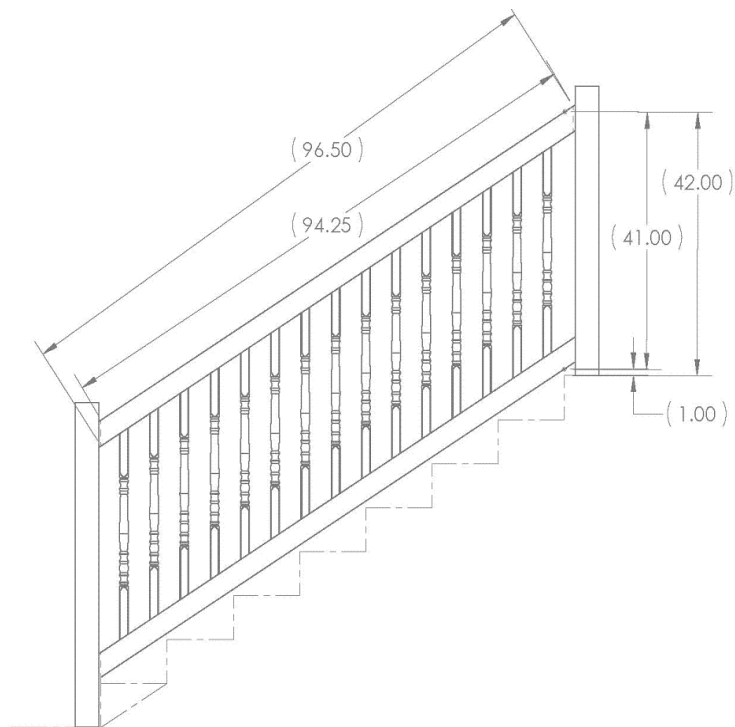


FIGURE 12 – TYPICAL 8' x 42" RELIANT® STAIR KIT COLONIAL

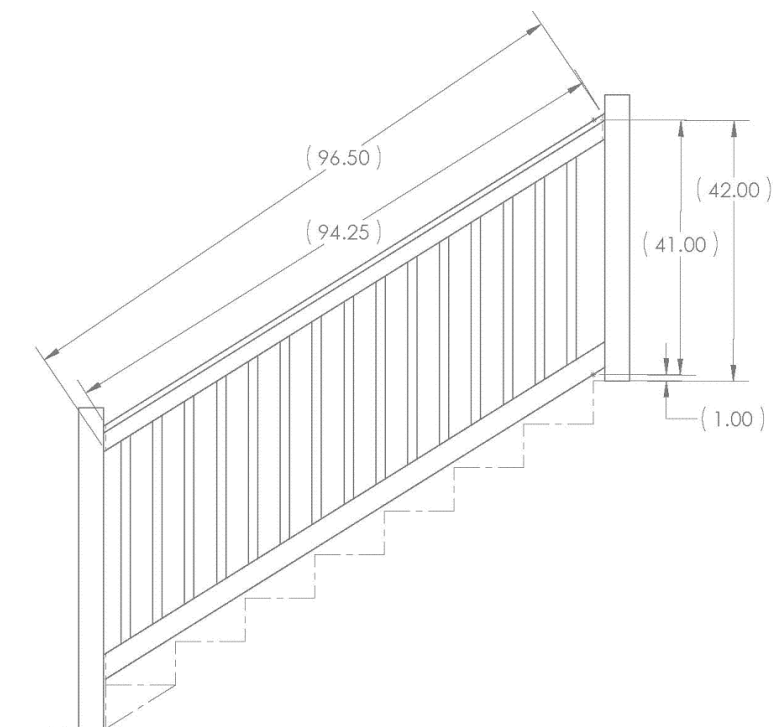


FIGURE 13 – TYPICAL 8' x 42" SENTINEL® STAIR KIT SQUARE

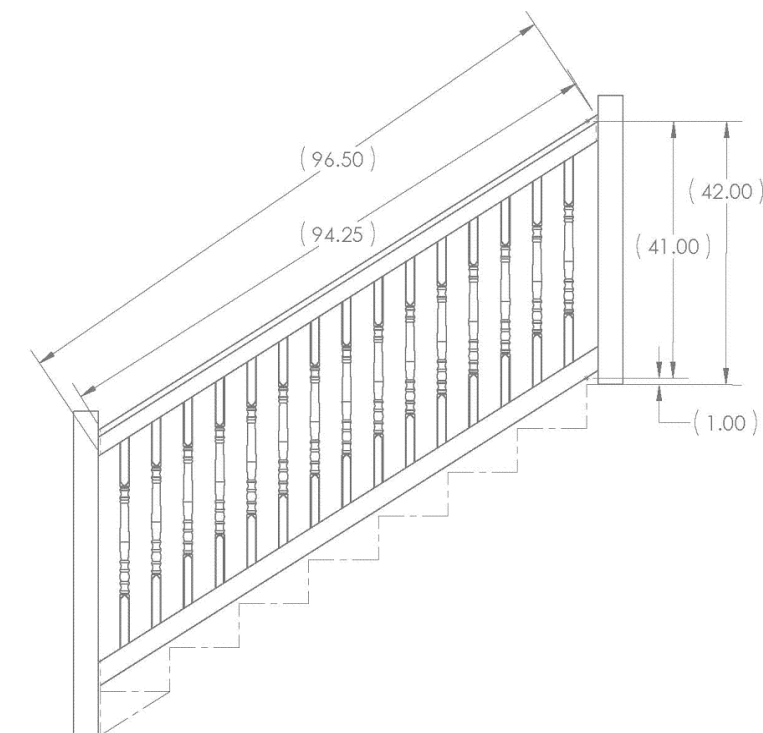


FIGURE 14 – TYPICAL 8' x 42" SENTINEL® STAIR KIT COLONIAL

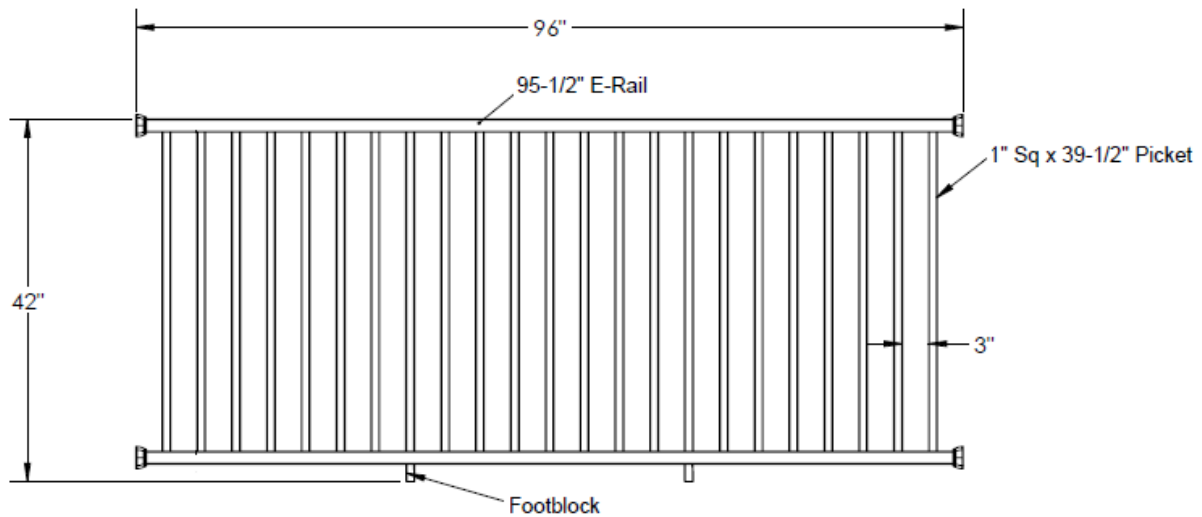


FIGURE 15 – TYPICAL 8' x 42" e-RAIL LEVEL RAIL KIT

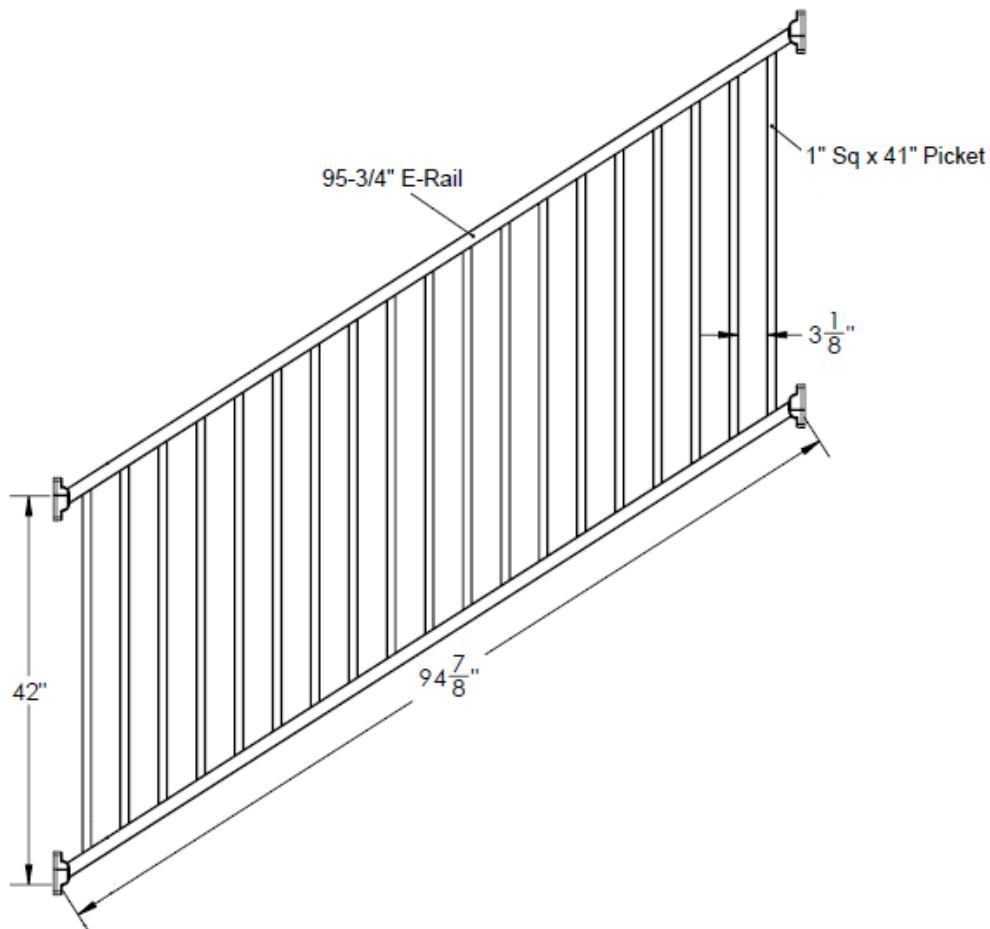


FIGURE 16 – TYPICAL 8' x 42" e-RAIL STAIR RAIL KIT

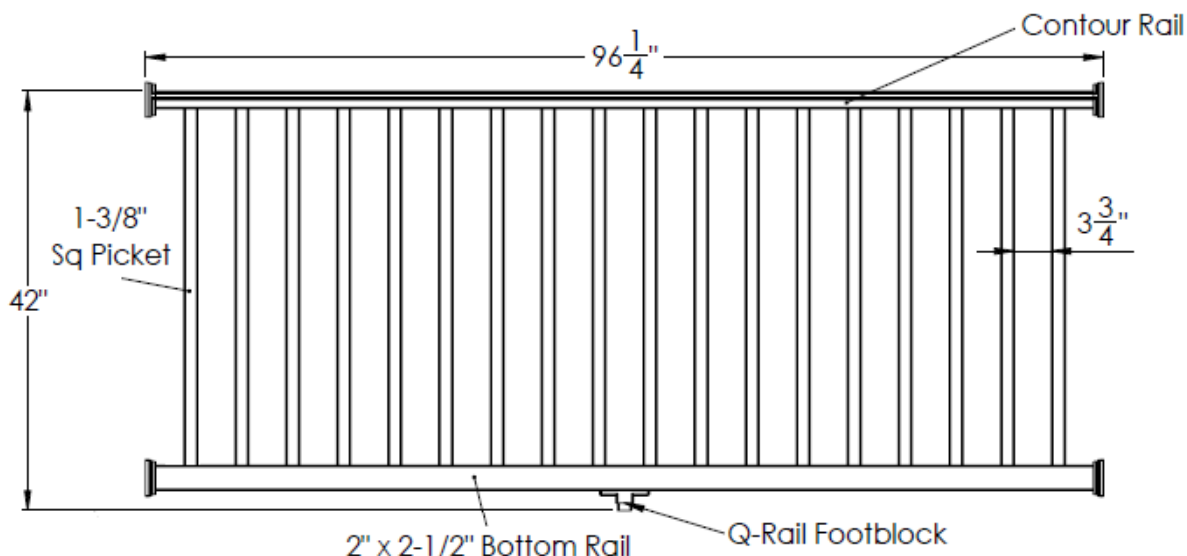


FIGURE 17 – TYPICAL 8' x 42" QUANTUM RAIL LEVEL RAIL KIT

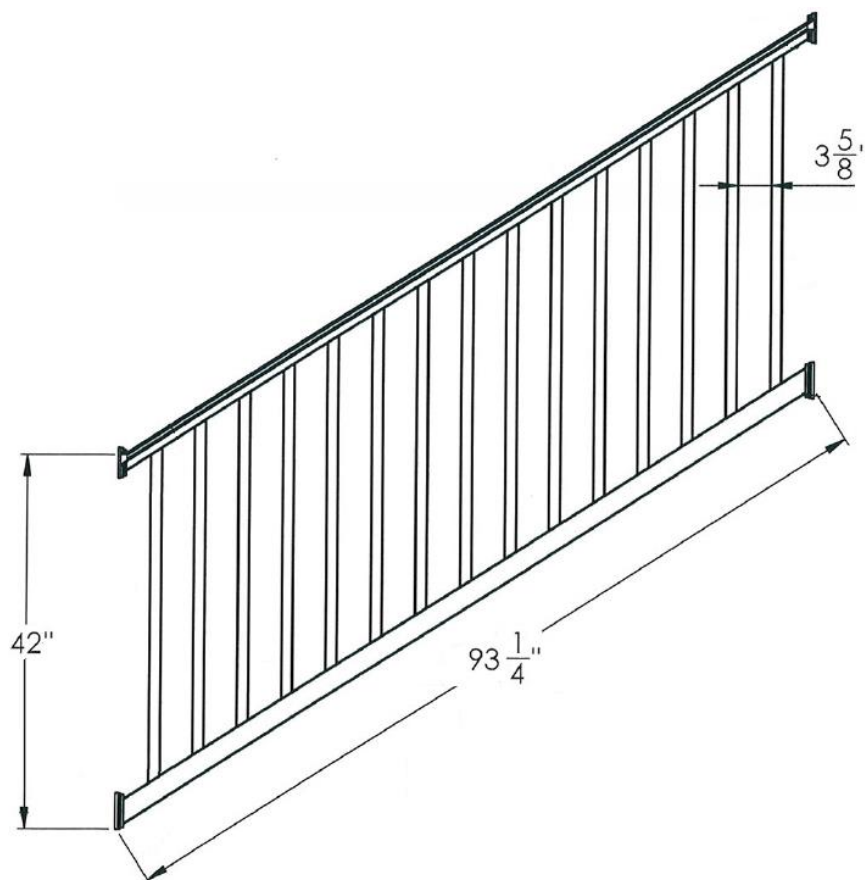


FIGURE 18 – TYPICAL 8' x 42" QUANTUM RAIL STAIR RAIL KIT