Code Compliance Research Report CCRR-0148

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1.0 Subject

Guardrail Systems

PRESIDIO® Sentinel®

PRESIDIO® Reliant®

2.0 Research Scope

2.1. Building codes:

2009 International Building Code (IBC)

2009 International Residential Code (IRC)

2007 Florida Building Code (FBC) *Excluding High-Velocity Hurricane Zones*

1999 BOCA National Building Code (BNBC)

1998 International One- and Two-Family Dwelling Code (IOTFDC)

2.2. Properties:

Structural Performance

Durability

Surface Burning

Decay Resistance

Termite Resistance

3.0 Description

3.1. General – The *Westech PRESIDIO® Sentinel® and Reliant® Railing* 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.

3.2. Guard systems include a top and bottom rail, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings.

3.3. Materials and Processes - Railings are an assemblage of extruded and molded components utilizing Poly Vinyl Chloride (PVC) material and aluminum reinforcements. PVC material is produced in five colors: White, Almond, Pebblestone, Clay and Stone

3.4. The top assembly consists of one rail with an aluminum reinforcing insert, and is attached to each structural support with a single nylon post bracket. See Figures 1, 2, 4, 5 and 8.

3.5. The bottom assembly consists of one rail, and is attached to each structural support with a single nylon post bracket. See Figures 3 and 8.

3.6. Structural supports may be conventional wood framing or an LMT Blu-Mount Steel Post Mount (See Figure 9.) 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.

3.6.1. LMT Blu-Mount Steel Post Mounts are comprised of a 2" square steel tube and welded 5/8" thick steel base plate for anchorage. A molded PVC or Aluminum spacer/mounting block provides for attachment of rail brackets. See Figure 9.

3.7. Balusters are supplied in two styles, 1.5 inch square and a decorative blow molded spindle. (Colonial Baluster) The balusters are placed through routed openings in the top and bottom rails. See Figures 6 and 7.

3.8. Level guards with heights of up to 42 inches above the floor surface are provided in rail lengths up to 96 inches. See Table 1.

3.9. Stair guards are provided in rail lengths up to 94 inches as measured along the upper rail. See Table 1.

4.0 Performance Characteristics

4.1. The guard systems described in this report have demonstrated the capacity to resist the design loadings specified in Chapter 16 of the IBC 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 65 or less determined by testing in accordance with ASTM E 84. The referenced criteria within AC174, requires a flame spread index not exceeding 200.

5.0 Installation

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 top and bottom rails, both level and stair, are attached directly to structural supports utilizing Nylon mounting brackets. See Table 2 for attachment details.

5.3. The top and bottom rails may be attached to either conventional wood supports or a 4x4 PVC post and LMT Blu-Mount Steel Post Mount. (See Figure 9.) 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 a section of 1.5 inch square baluster installed at the mid-span of the bottom rail between the deck surface and the rail and are secured via routing to the center of the underside of the bottom rail.

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 9.) The type and length of anchor bolts is dependant 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), effective June 1, 2009.

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. A quality control manual that is in accordance with the ICC-ES AC10, Acceptance Criteria for Quality Documentation.

7.0 Conditions of Use

The guard 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, 1407.4 of the BNBC, the IRC and the IOTFDC

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 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. Guard Systems are manufactured in Mount Vernon Indiana in accordance with the manufacturer's approved quality control system with inspections by Architectural Testing, Inc. (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. Name and/or trademark of the manufacturer and the manufacturers address

8.2. The identifying mark of the independent inspection agency, (AA-676)

8.3. The ATI Code Compliance Research Report mark and number (CCRR-0148)

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 Architectural Testing.

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

Table 1
Railing System Building Code Recognition

Guardrail System	Guardrail Type Length[1] x Height[2]	Posts	Code and Occupancy Classification
Reliant®	96" x 42" Level 94" x 42" Stair	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IRC IOTFDC IBC – All Use Groups BOCA – All Use Groups
Sentinel®	96" x 42" Level 94" x 42" Stair	Sleeved wood 4x4; Blue Mount w/PVC or Aluminum Guides	IRC IOTFDC IBC – All Use Groups BOCA – All Use Groups

[1] Railing lengths are maximum clear length between supports. Stair railing lengths are measured along the 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 and IOTFDC may be 36" minimum.

Table 2
Rail/Bracket Fastening Schedule

Connection	Fastener
Nylon Post Bracket to PVC-Sleeved LMT Blu-Mount	Four #10 x 1in x 16 TPI, pan-head, self drilling, plated steel, sheet metal screws
Nylon Post 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
Nylon Post 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)
Blu-Mount to Steel Test Bed	Four 3/8 in Grade 5 bolts

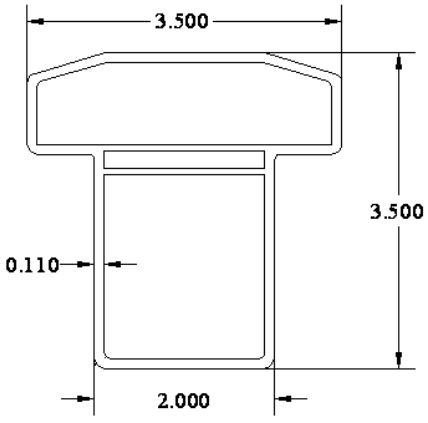

Figure 1
***Sentinel*® Top Rail Profile**

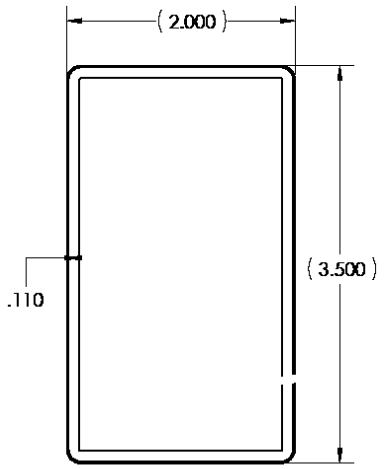

Figure 2
Reliant® Top Rail Profile

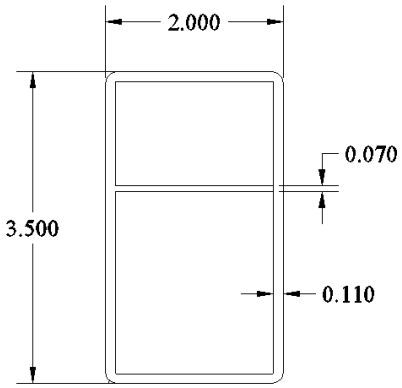

Figure 3
Bottom Rail Profile

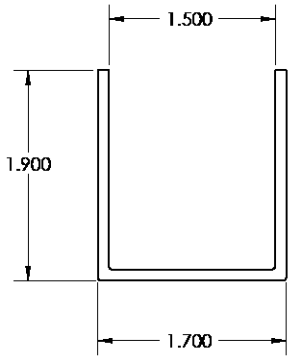

Figure 4
Sentinel® Aluminum Rail Insert

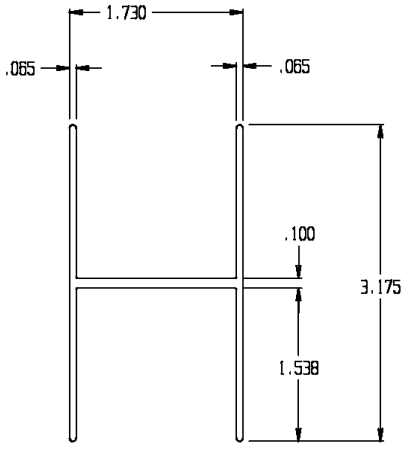

Figure 5
***Reliant*® Aluminum Rail Insert**

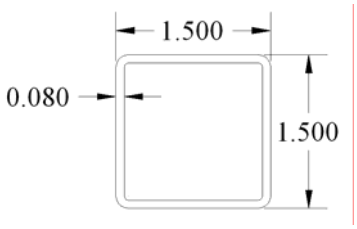

Figure 6
Square Baluster Profile

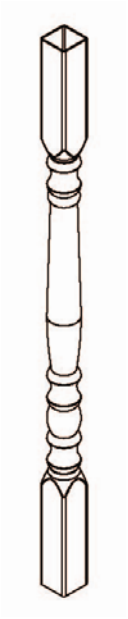

Figure 7
Colonial Baluster

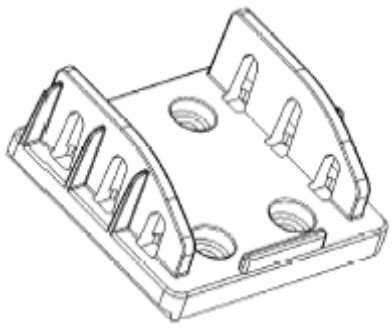

Figure 8
Nylon Post Bracket

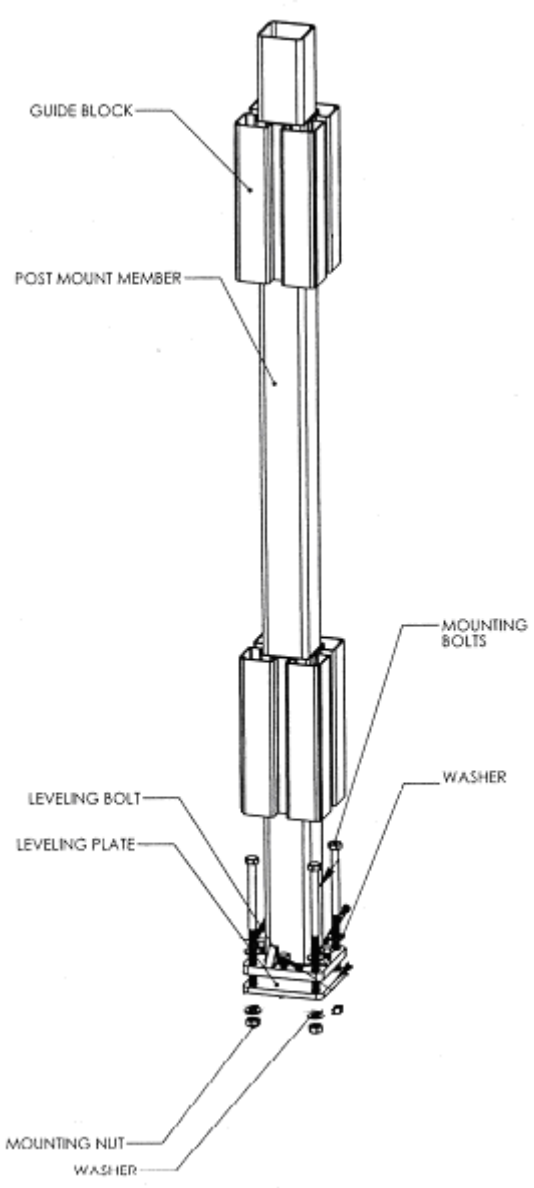

Figure 9
Blu-Mount w/PVC or Aluminum Guides

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.

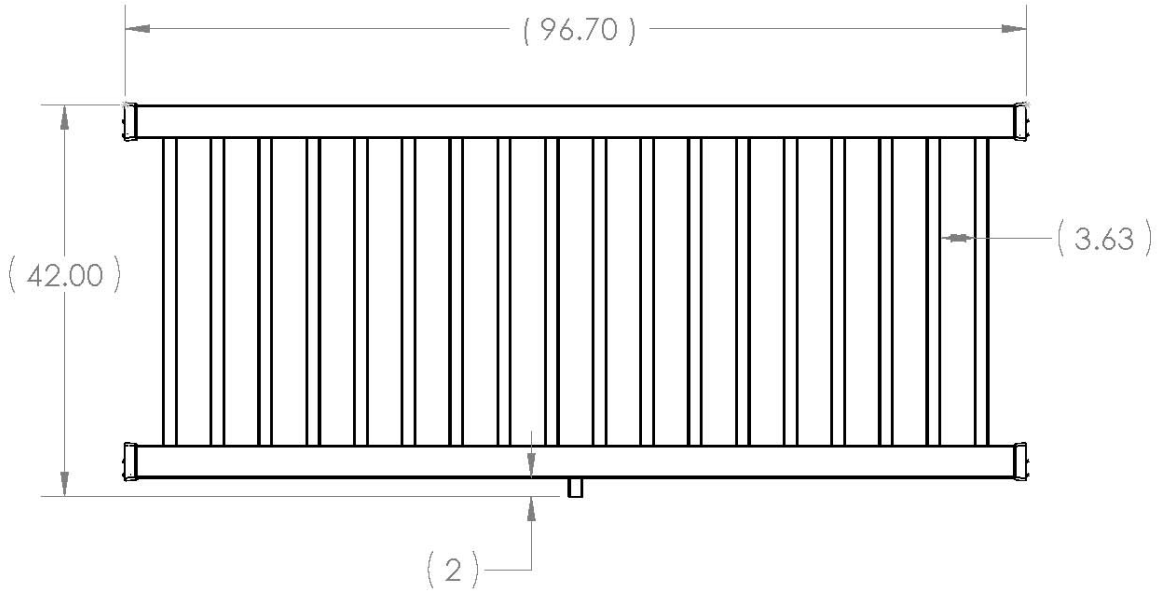

Figure 10 – Typical 8' x 42" Reliant® Rail Kit Square
(96.70 inches dimension includes length added by brackets)

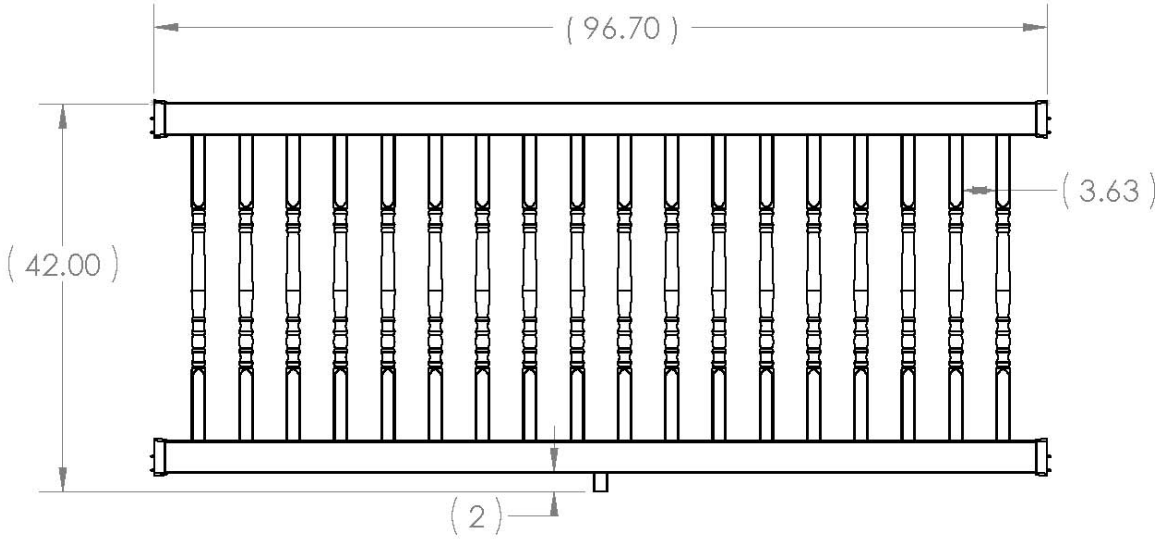

Figure 11 – Typical 8' x 42" Reliant® Rail Kit Colonial
(96.70 inches dimension includes length added by brackets)

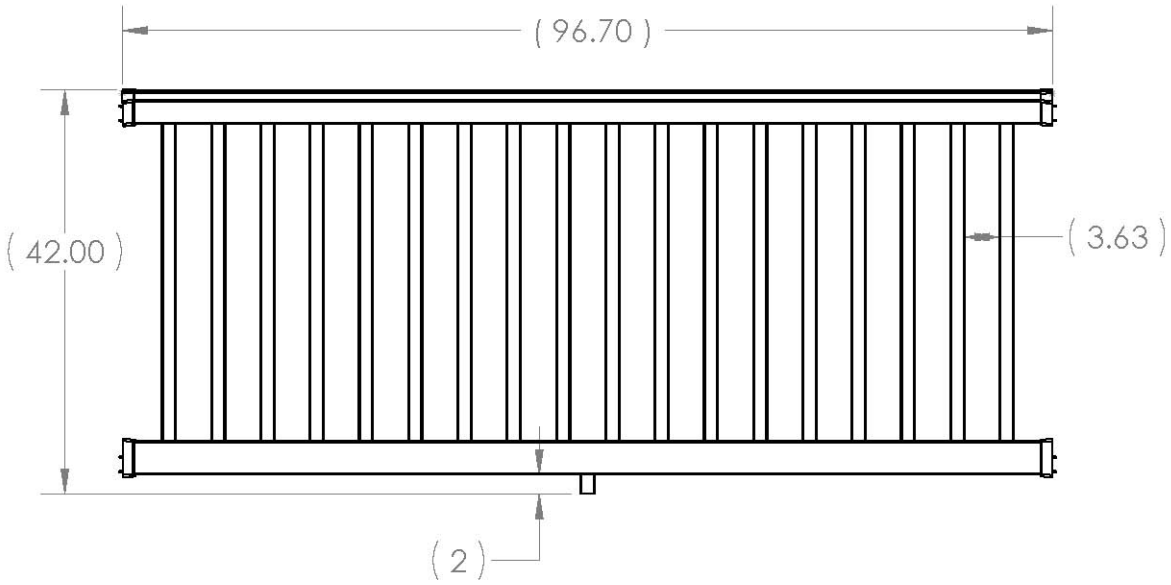

Figure 12 – Typical 8' x 42" Sentinel® Rail Kit Square
(96.70 inches dimension includes length added by brackets)

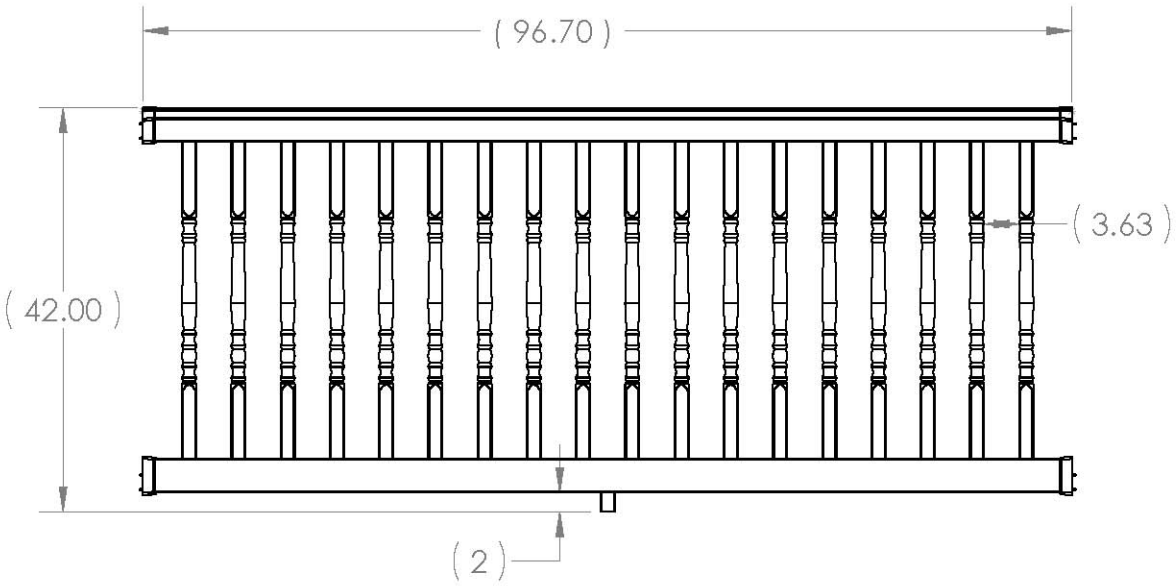

Figure 13 – Typical 8' x 42" Sentinel® Rail Kit Colonial
(96.70 inches dimension includes length added by brackets)

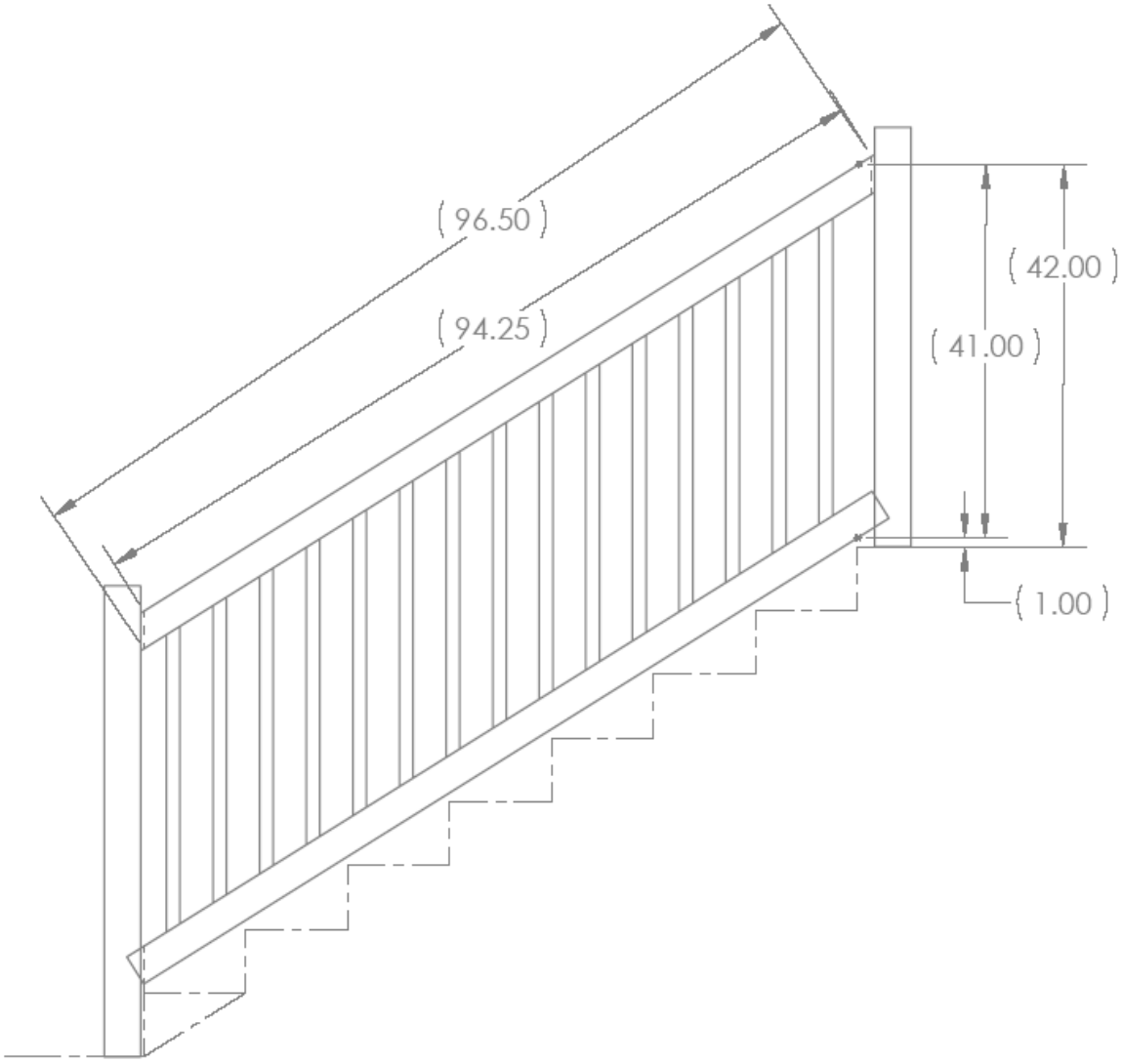

Figure 14 – Typical 8' x 42" Reliant® Stair Kit Square

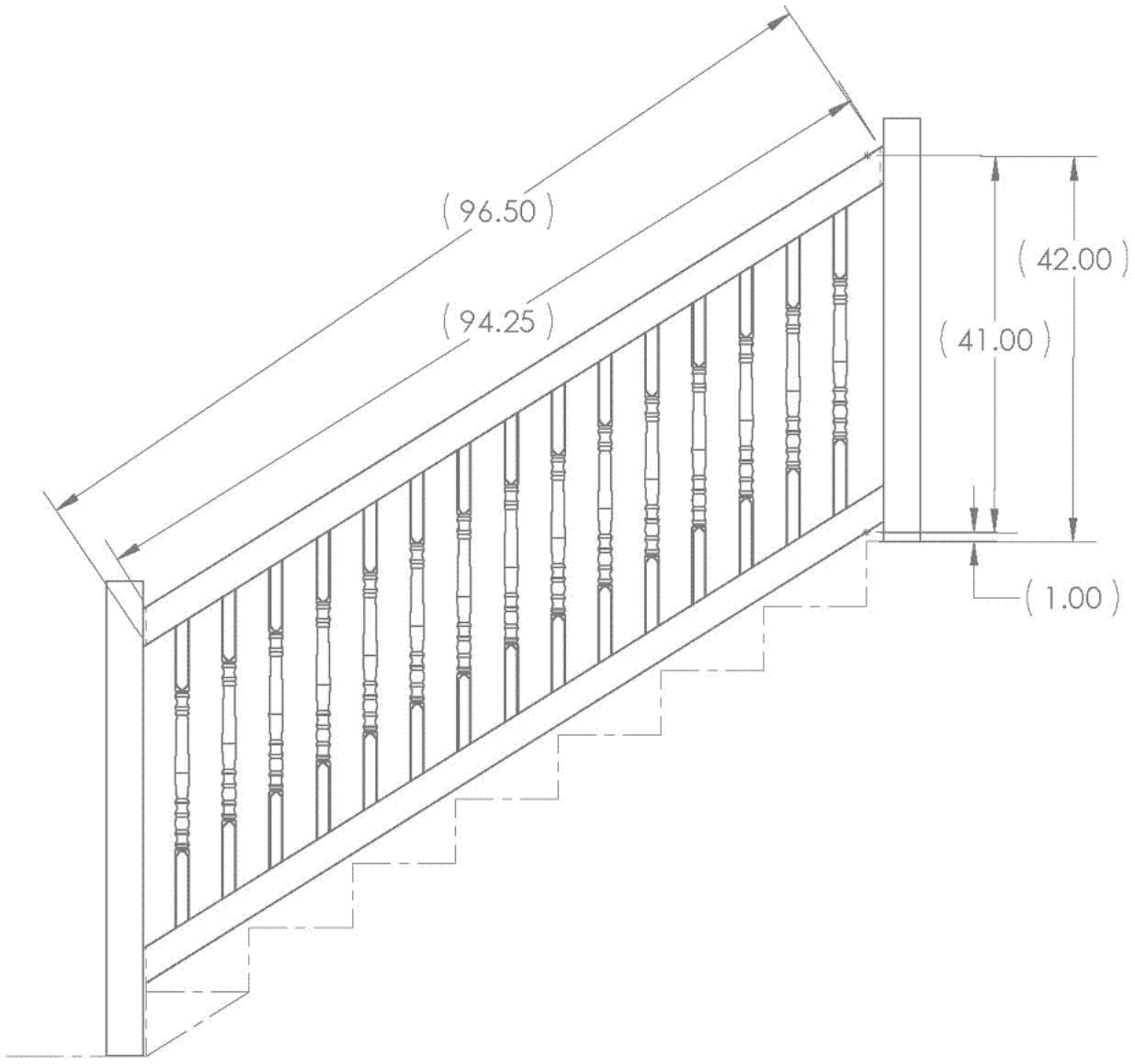

Figure 15 – Typical 8' x 42" Reliant® Stair Kit Colonial

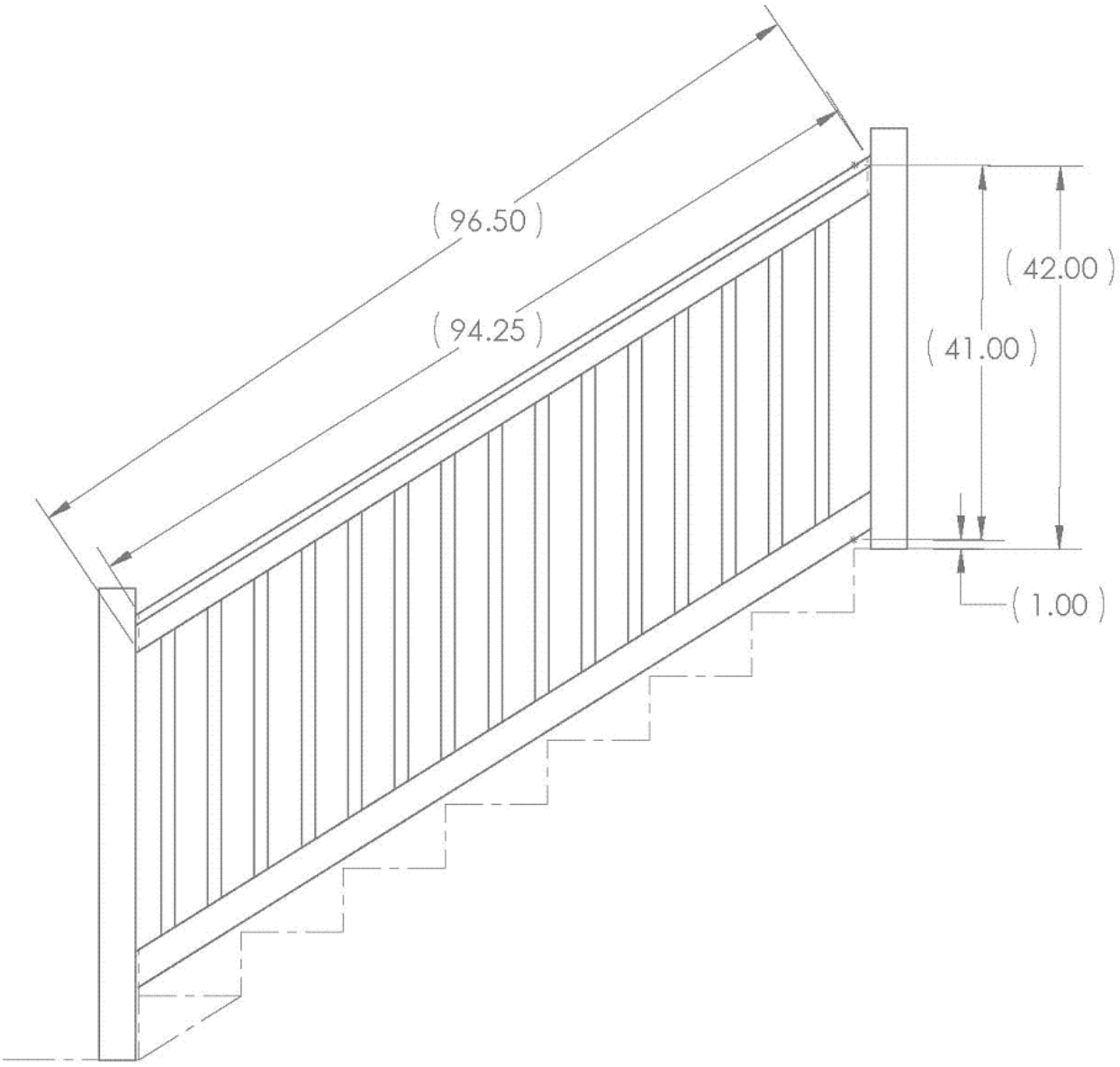

Figure 16 – Typical 8' x 42" Sentinel® Stair Kit Square

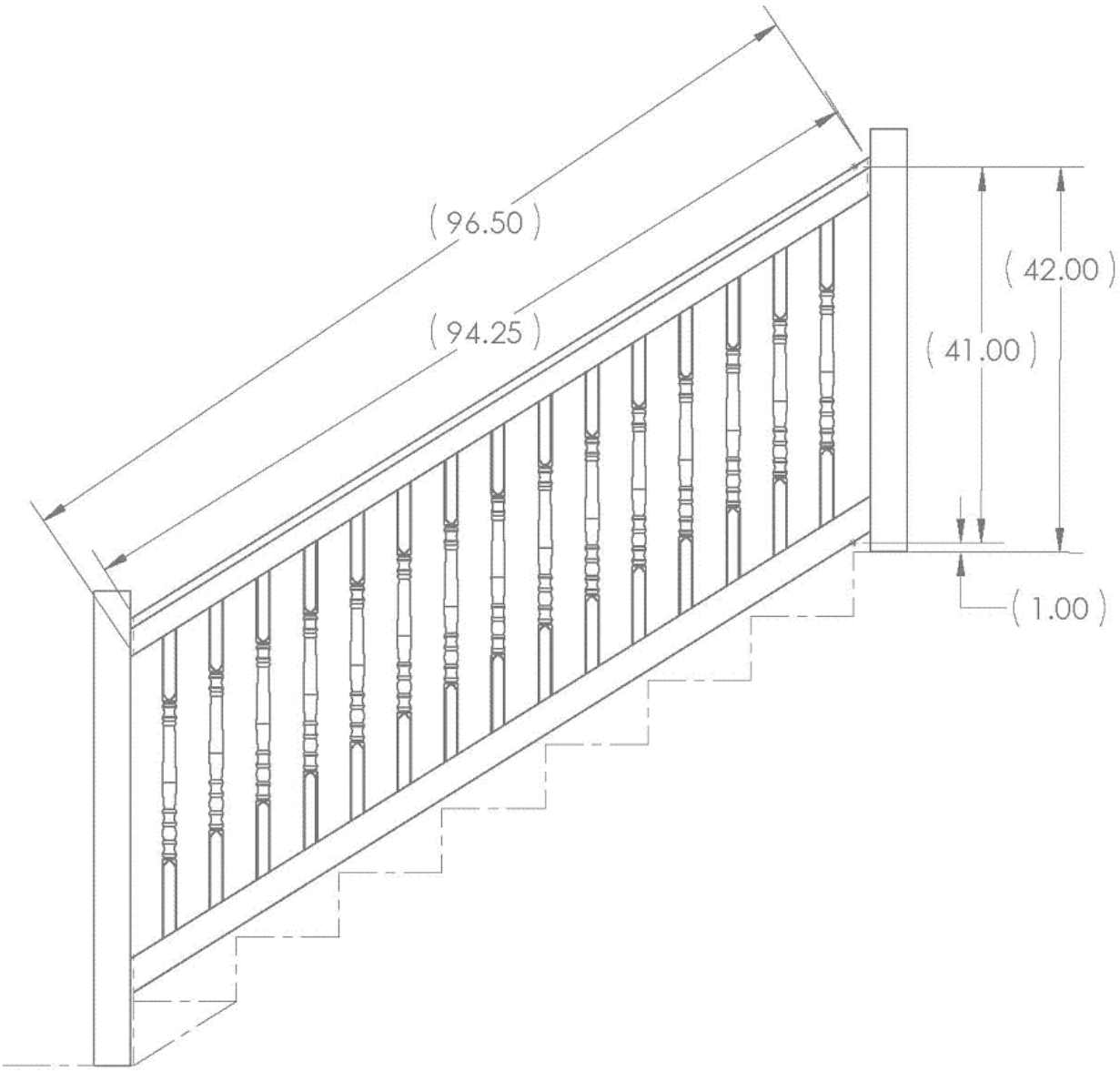

Figure 17 – Typical 8' x 42" Sentinel® Stair Kit Colonial