Digger Specialties, Inc.

Total
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Super
Trust

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January 29, 2015

Petition for Declaratory Statement
Before The Florida Building Commission

Company: Digger Specialties Inc.
PO Box 241
Bremen, IN 46506

DS 2015-007

Name: Gary Kauffman
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Staute(s), Agency Rule(s), Agency Order(s), and/or Code Section(s) on which the Declaratory Statement is sought- Rule 61G20-3 State Product Approval

Background: Digger Specialties Inc. is a manufacturer of aluminum and vinyl railing products that are distributed across the United States including Florida. This railing is sold through distribution channels. Many of the products we sell have passed IBC, IRC, and FBC testing on them. They are backed by Third Party testing results from commission approved agencies. These Companies are **Architectural Testing Inc**. and **ICC Evaluation Services**. I am looking for clarification on whether railing products used in Florida have to have a Florida Product Approval number before they can be sold. Our customers have been told by local code authorities that they have to have one or they will not approve the product.

Do the aluminum and vinyl railings in question fall within the scope of 61G20-3

Kind Regards,

Gary Kauffman
Product Manager
Digger Specialties Inc.

Code Compliance Research Report CCRR-0147

Subject to Renewal: 06/09/2015
Visit www.archtest.com for current status
Issued: 06/13/2013

Digger Specialties, Inc.
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1.0 Subject

PolyRAIL Systems TRX Vinyl Guardrail System

2.0 Research Scope

2.1. Building Codes:

2012 International Building Code (IBC)

2012 International Residential Code (IRC)

2010 Florida Building Code (FBC) - Excluding High-Velocity Hurricane Zones

2.2. Properties:

Structural Performance

Durability

Surface Burning

Decay Resistance

Termite Resistance

3.0 Description

3.1. General – The TRX Vinyl Guardrail Systems described in this report 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. Guardrail systems include a top and bottom rail, with aluminum inserts, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings.

3.3. Rails, post sleeves, foot blocks, balusters and decorative moldings are extruded Polyvinyl Chloride (PVC) produced in a single color; White.

3.4. All top rails are provided with an aluminum insert with a 'T' profile. All bottom rails are provided with an aluminum insert with a 'U' profile. All rail inserts are extrusions of 6063-T6 aluminum. See Figure 2.

3.5. Level guards with heights of up to 42 inches above the floor surface are provided in lengths up to 8 feet as measured from inside-to-inside of supports.

3.6. The top assembly consists of one rail, and is attached to each support with a single PVC bracket. The top rail is a 'T' profile and is 1.75 inches high by 3.25 inches wide See Figure 1.

3.7. The bottom assembly consists of one rail, and is attached to each support with a single PVC bracket. The bottom rail is 1.75 inches square. See Figure 1.

3.8. Balusters are extruded PVC and are 1.375 inches square. The balusters are placed through routed openings in both the top and bottom rails to provide a means for securing the balusters in the rails.

3.9. The baluster spacing resulting from assemblies recognized in this report shall provide spacing such that a 4 inch diameter sphere cannot pass through any opening between balusters.

3.10. Post sleeves are 4 inches square and have a wall thickness of 0.16 inch.

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 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 35 when tested according to ASTM E 84. The referenced criteria within AC174, requires a flame spread index not exceeding 200 when tested in accordance with ASTM E 84.

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 rail assemblies are attached to PVC sleeved conventional wood posts or other supporting structure with a mounting bracket. See Figure 3.

5.3. One mounting bracket attaches to each end of the upper rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using two (2) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.4. One mounting bracket attaches to each end of the lower rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using four (4) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.5. Foot blocks are intermediate bottom rail supports and are installed between the deck surface and the rail at the mid-point of the rail and consist of a 2.0 inch section of baluster and a 1.312 inch by 0.625 inch HDPE block. The HDPE block is attached to the bottom rail utilizing two (2) #12 by 1.25 inch thread cutting screws. The baluster section is attached to the HDPE block utilizing two (2) #8 by 0.75 inch self-drilling screws.

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.

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 January 2012.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements ASTM D 7032-08, 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", effective December, 2012..

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. Guards recognized in this report and regulated by the IBC or IRC are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC and in One and Two Family Dwellings regulated by the IRC.

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 (See 5.6 under "Installation"). Where required by the building official, engineering calculations and details prepared by a licensed design professional shall be provided.

7.3. Skewed mounting bracket connections to supports are not within the scope of this report and are subject to evaluation and approval by the building official.

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

7.5. All products are manufactured in Bremen, Indiana by Digger Specialties, Inc. in accordance with the manufacturer's approved quality control system with inspections by NTA, Inc. (AA-682.)

8.0 Identification

The composite guard assemblies produced by Digger Specialties, 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 and/or name of the independent inspection agency, NTA (AA-682)

8.3. The Architectural Testing registered mark and CCRR number (CCRR-0147).

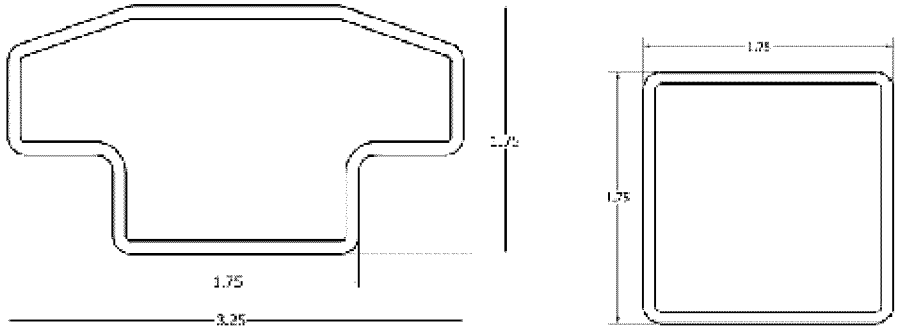
8.4. The statement "See ATI CCRR-0147 at www.ati-es.com for uses and performance levels."

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.

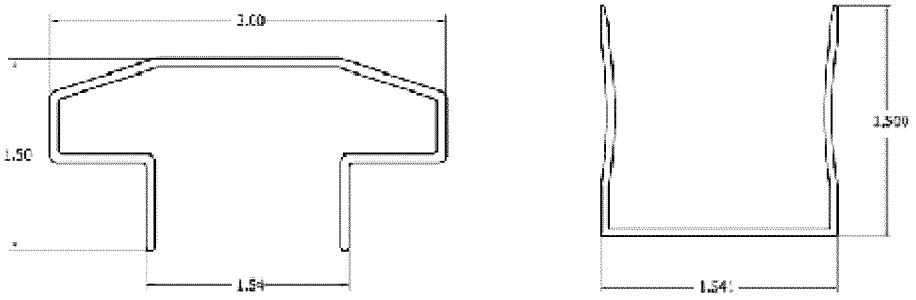
9.2. Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Architectural Testing.

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.



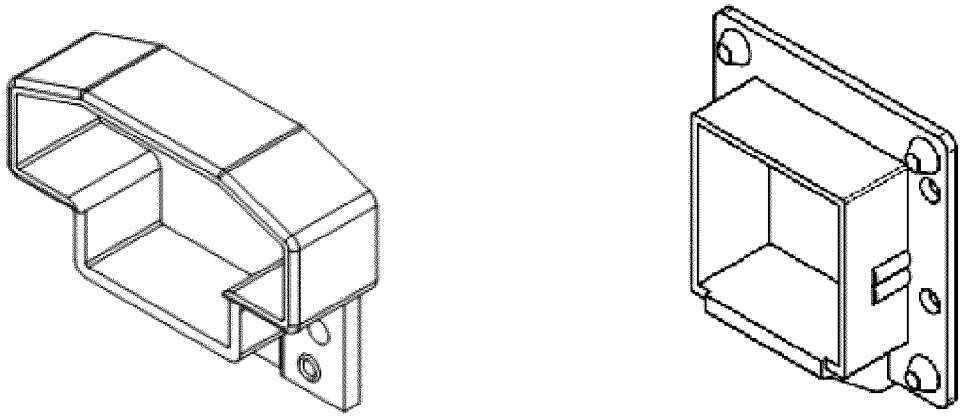
Top 'T' Rail Profile **Bottom Rail Profile**

Figure 1 – Rail Profiles



Top Rail **Bottom Rail**

Figure 2 - Aluminum Rail Inserts



Top **Bottom**

Figure 3 – Mounting Brackets

TRX & SRX Vinyl and TRX "B" Series Railing

Installation Instructions

NOTE: These instructions must be followed exactly as written and the material used must be exactly as shown in the instructions. Any deviation from the instructions or variation in the material used/installed may result in an unsuccessful installation.

Post Applications

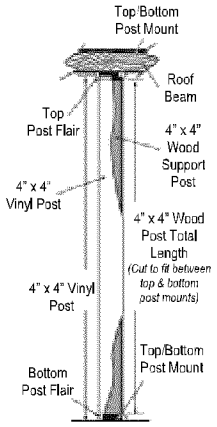
Aluminum Post Mount for Concrete & Wood Applications:

If using a Standard Aluminum Post Mount (Residential) or Heavy-Duty Aluminum Post Mount (Commercial), see the instructions included with your mount.

4" x 4" Wood Support Posts:

Note: A 4" x 4" Vinyl Post does not have any structural strength to support weight bearing roofs.

A 4" x 4" wood treated post (which measures 3½" x 3½") will slide inside the vinyl post to support the weight. Most of the time, your posts are installed after the roof is in place. Usually, there is a beam the post can be attached to. Following are steps needed to install this post system. We do realize you can run into many different situations at the job site. In those cases, field modifications may be needed.



Vinyl post over 4" x 4" wood support post to provide structural strength

Step 1:

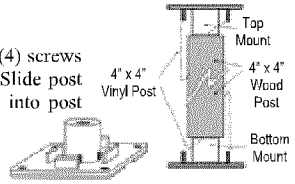
Cut vinyl post and wood post to size. To determine wood post length, stack (2) top/bottom support post mounts and measure distance between mounts and beam. To determine vinyl post length, measure distance between floor and beam and deduct 1". This will ensure no weight bearing on the vinyl post. NOTE: On wood, make sure there is structural strength to support the weight of the roof.

Step 2:

All material will need to be applied to the post before installation. Slide post flairs over top and bottom of post. Slide wood post inside vinyl post. Insert a post support mount on each end. The post support mount can be screwed to the wood post if desired (screws not included).

Step 3:

Slide post assembly into position. Insert (4) screws into each mount (screws not provided). Slide post flairs into position. Tabs will snap-lock into post support mounts. Flairs may be glued if desired (glue not included). **WARNING: Excessive glue may run down post.** Hold top flair in place until glue is cured.



4" Post Support Mount
(Use on both top and bottom of 4" x 4" wood post.)

4" x 4" Wood Support Posts - For Decks

Note: The strongest and least expensive way to apply a 4" x 4" vinyl post to a deck is to EXTEND your wood 4" x 4"'s above the deck approximately 24".

Following are steps to use when building a frame deck or working with an existing wood structure.

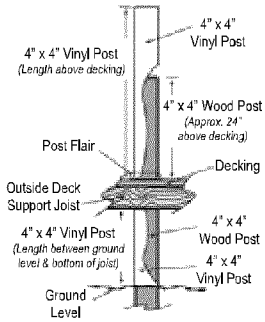
Step 1:

When building a new deck and using 4" x 4" wood posts to support the wood structure, layout your post setting so it works out for both wood frame structure and length of railing sections you plan to install.

Step 2:

Set all wood posts leaving approximately 24" of the post(s) above determined height of floor or deck surface. **NOTE: 24" of wood post is sufficient support for 36" or 42" vinyl railing systems.** The higher the wood post is above the floor, the greater the chance for the wood post to warp.

If vinyl posts are desired below the floor joint, slide these posts on before the support board is attached. **NOTE: These vinyl posts will go from the ground to the bottom of the joist support board.**



Vinyl post over a 4" x 4" wood support Post for deck applications

Step 3:

After wood frame and deck flooring are installed, slide vinyl post over wood post. Slide post flair on at this time.

Option: Vinyl Posts on Existing Deck

When vinyl posts are to be attached to an existing wood deck and no wood posts are protruding above the deck floor, use an aluminum post mount (see instructions for wood surface) or install a 4" x 4" wood post as follows:

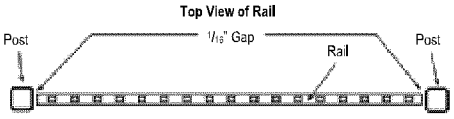
Step 1:

Cut a 4" x 4" hole in existing floor right inside joist support board. Install a wood 4" x 4" post to go to the bottom of the joist support board. This will extend above the deck floor approximately 24". Attach wood post with screws or bolts through support board and into wood post. After deck flooring is installed, slide vinyl post and flair over wood post.

Level Railing Applications

Step 1:

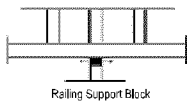
Hold each rail against posts. Position so there will be the same baluster spacing on each end of the rail. Mark top and bottom rails where they need to be cut. Cut rails to length. **NOTE: Make sure rails are cut with a 1/16" gap on each end between rails and posts.**

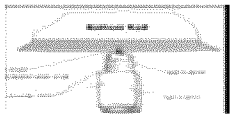


Center the top and bottom rails between the posts
(Shown with holes for vinyl baluster)

Step 2:

If installing a section longer than 4', a railing support is required. It needs to be attached to the bottom rail at this time to assure the section will not sag.





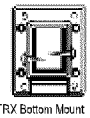
Vinyl: ***Find center of bottom rail. Screw plastic wood block to bottom side of rail. Slide vinyl extrusion over plastic wood block and screw to block with (2) screws (refer to diagram). All screws are provided for the railing support system.***

Aluminum: ***Find center of bottom rail. Insert screw into aluminum support and screw to bottom rail. Turn support to adjust height.***

Step 3:

Slide a mount over each end of the rail (make sure profile side of mount is down). Place bottom rail in position. Standard gap from floor is 2".

TRX Top Mount



TRX Bottom Mount
SRX Top/Bottom Mount

Center and screw mounts to post with (4) 1¼" screws (screws provided). Insert (2) ¾" self-tapping screws through location tabs (screws provided). ***IMPORTANT: Continue tightening until inside channel is drawn against inside of rail.*** Insert vertical baluster into bottom rail holes. If there are notched balusters, they need to be placed in

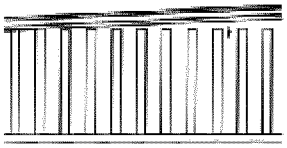
Continued on backside

TRX & SRX Vinyl and TRX "B" Series Railing

Installation Instructions...*Continued*

Level Railing Applications...*Continued*

middle of the section. Position top rail into balusters one at a time. Position top rail between posts and fasten top mounts to post with screws (like bottom mount procedure).



Assemble Rail Section

If using standard height posts, top rail should be 2" down (2⅜" down if using an aluminum post mount) from top of post. Should a special height railing be required, the balusters and post may be cut down.

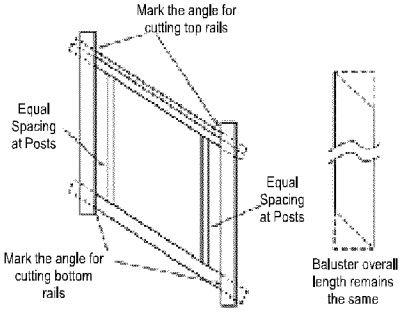
Place mount covers over mounts. Tap each corner of cover to secure it to mount. ***CAUTION:*** *For bottom mount cover, line up top two corners of cover and* ***LIGHTLY TAP*** *the corners with a hammer. Then,* ***carefully line up*** *bottom of cover and* ***LIGHTLY TAP*** *with a hammer.*

Stair Rail Applications

NOTE: Make sure to review level railing applications before these steps are attempted. Stair rail mounts are needed for stair rail applications. Stair rail mounts are designed for a 32° to 35° application. Uncut stair rail mounts are available for other angle applications.

Step 1:

Lay the bottom rail on the steps and up against the posts. Determine the two end holes. Insert a baluster at each end of rail. Place top rail on top of these two balusters. Holding rails against posts, determine exact end spacings, mark rails for cutting. If balusters are too tight and not level, make holes larger by filing out holes accordingly. Then, cut both rails at angle marks. Cut each end of the balusters at the same angle as top and bottom rails were cut. NOTE: The overall length of balusters will not change.

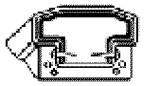


NOTE: Above ground application requires a 48" post at the bottom step. Field cut after railing is installed. The "A" Series Post must be cut off at the bottom before railing is installed. "A" Series Post length for bottom of steps - 48" for 36" railing and 52" for 42" railing.

Step 2:

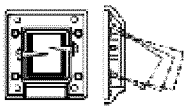
Slide a mount over each end of the rail (make sure profile side of mount is down, remove spacer from bottom mount). Place bottom rail in position.

Center and screw mounts to post with (4) 1¼" screws (screws provided). Insert (2) ¾" self-tapping screws through location tabs (screws provided). Insert vertical balusters into bottom rail holes. Position top rail into balusters one at a time. Position top rail between posts and fasten top mount to post with screws (like bottom mount procedure).



TRX Top Stair Mount

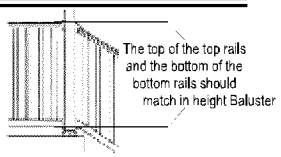
If using standard height posts, top rail should be 2" down from top of post. Should a special height railing be required, the balusters and post may be cut down.



TRX Bottom Stair Mount
SRX Top/Bottom Stair Mount

Place mount covers over mounts. Bottom cover has a knock out for a 32° to 35° angle (or may be cut out for varying angles). Tap each corner of cover to secure it to mount. ***CAUTION:*** *For bottom mount cover, line up top two corners of cover and* ***LIGHTLY TAP*** *the corners with a hammer. Then,* ***carefully line up*** *bottom of cover and* ***LIGHTLY TAP*** *with a hammer.*

The top to bottom measurement should be the same for both the stair rail and the level rail sections.

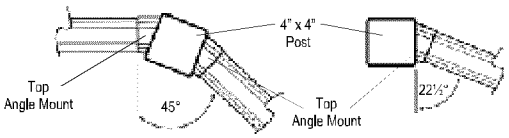


Angle Applications

NOTE: Make sure to review the level application installation before these steps are attempted. Angle mounts are needed for level application. ***These mounts can be cut to accept UP TO a 22½° angle.*** *For greater degree angles, the post must be rotated so both the post and mount will equal the total degree of angle. (i.e.: Post 22½° + mount 22½° = total 45° angle.)*

Step 1:

Cut rails to correct length, angle to fit in between posts. Make sure it is cut to be the same baluster spacing at each end of the rails. **NOTE: These mounts can be cut to accept UP TO a 22½° angle.**

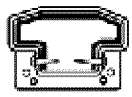


Top view of angled top rail mounts

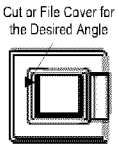
Step 2:

Top Mount...

The top mount will need to be cut at an angle to align with the post angle. Position top mount on rail to determine where to cut. Mark mount and cut on a miter saw. If needed, use a belt sander to sand down mount until you get an exact fit to the post. After mounts fit on post correctly, slide over each end of rail. Refer to Level Application, Step 3.



TRX Top Angle Mount



TRX Bottom Angle Mount
SRX Top/Bottom Angle Mount

The profile edge of mount should be placed to the inside of the rail angle to hide the rough edge.

Bottom Mount...

Remove spacer from mount. Turn profile toward inside of the rail angle. Center and screw mounts to post with (4) 1¼" screws (screws provided). Insert (2) ¾" self-tapping screws (screws provided) through location tabs. Insert vertical balusters into bottom rail holes. If there are notched balusters, they need to be placed in the middle of the section. Position top rail into balusters one a time. Position top rail between posts and fasten top mounts to post with screws (like bottom mount procedure).

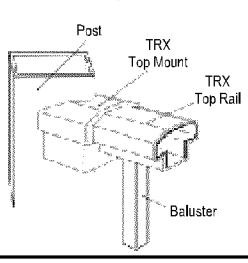
45° Angle Mount Application

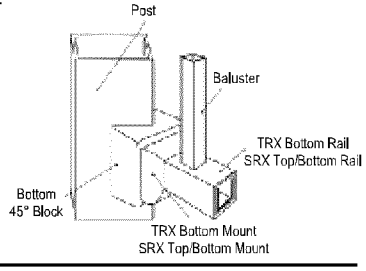
Step 1:

Place a bottom 45° Block on the corners of the posts. Cut bottom rail to fit between blocks. Refer to Level Railing Application, Step 1. Top rail will be same size as bottom rail if post is level. (Both rails will be cut square.)

Step 2:

Refer to Level Railing Applications to install sections. NOTE: Pilot holes are required in post. For bottom mounts, drill completely through mounts to indicate where pilot holes will be.

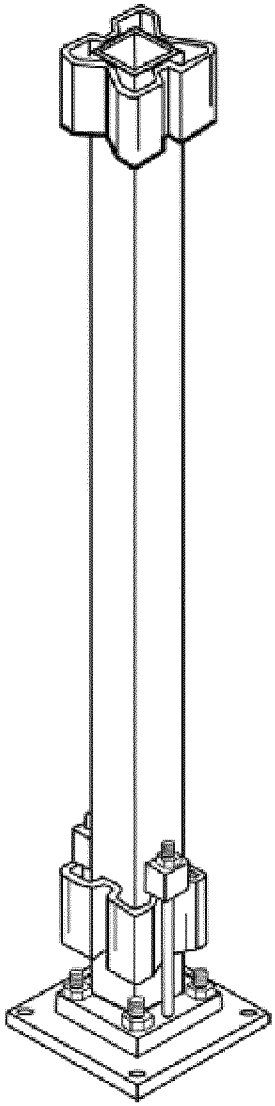




Heavy Duty 4" Aluminum Post Mount (Commercial)

Installation Instructions

NOTE: These instructions must be followed exactly as written and the material used must be exactly as shown in the instructions. Any deviation from the instructions or variation in the material used/installed may result in an unsuccessful installation.



Heavy Duty
Aluminum Post Mount
(Commercial)

Concrete Surface Installation:

Place aluminum post mount so the stainless steel tube will be **PERPENDICULAR** to the railing. Fasten aluminum post mount to concrete using (4) ¼" x 3" concrete screws (screws not included). Slide the 4" vinyl post and flair down over the aluminum mount to approximately 6" from the floor. **If using an "A" Series Post, take top internal blocks off. These will not be needed.**

Level the vinyl post by using the leveling nuts on the aluminum post mount. A $^{9}/_{16}$" open end wrench will be needed for this. Once all the leveling nuts are tight, slide the vinyl post with flair to the floor.

When the railing system is installed, at least 2 screws from the external railing mount will go through the vinyl post and into the bottom block to secure the vinyl post to the mount.

Wood Surface Installation:

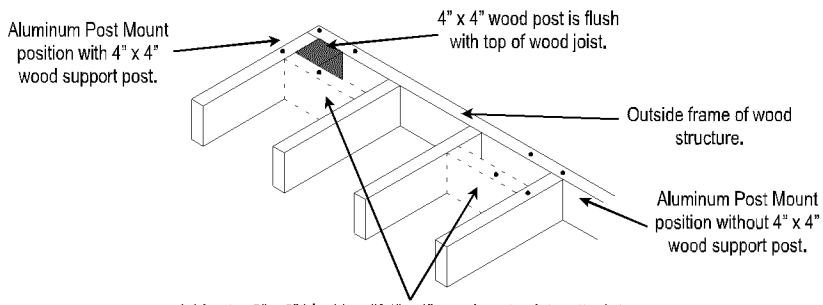
Place aluminum post mount so the stainless steel tube will be **PERPENDICULAR** to the railing. Fasten aluminum post mount to wood surface using (4) ¼" x 4" or longer stainless steel lags (lags not included). Slide the 4" vinyl post and flair down over the aluminum mount to approximately 6" from the floor. **If using an "A" Series Post, take top internal blocks off. They will not be needed.**

Level the vinyl post by using the leveling nuts on the aluminum post mount. A $^{9}/_{16}$" open end wrench will be needed for this. Once all the leveling nuts are tight, slide the vinyl post with flair to the floor.

When the railing system is installed, at least 2 screws from the external railing mounts will go through the vinyl post and into the bottom block to secure the vinyl post to the mount.

WARNING: When installing the Aluminum Post Mount on top of a wood structure, the 4" lags MUST be lagged entirely into substrate! It will not be strong enough if it is fastened into a 5/4' or a 1½" thick deck board!

Below is an example of how to design the wood structure to accept the Aluminum Post Mount. Any other way must meet or exceed these qualifications.



Code Compliance Research Report CCRR-0163

Subject to Renewal: 10/13/2014
Visit www.ati-es.com for current status

Issued: 11/02/2012
Revised: 04/07/2014

Digger Specialties, Inc.
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1.0 Subject

Westbury® Aluminum Railing

Tuscany Series (Style C10)

Riviera Series (Styles C30, C30R, C31, C32, C33, and C34)

Veranda Series (Style C70)

2.0 Research Scope

2.1. Building Codes:

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

2009 International Building Code (IBC)
2009 International Residential Code (IRC)

2010 Florida Building Code (FBC):

including High Velocity Hurricane Zone (HVHZ) for *Tuscany* and *Riviera Series*;

excluding High Velocity Hurricane Zone (HVHZ) for *Veranda Series*

2.2. Properties:

Structural Performance

3.0 Description

3.1. General – The *Westbury*® Aluminum Railing system is a guard or guardrail under the definitions of the referenced codes. It is intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the codes.

3.2. Guard Assemblies – Guards are provided as level guards for level walking areas such as decks, balconies, and porches. Level guards are provided with rail lengths up to 96 inches in length (measured between the inside of support posts) and an installed height of 36 inches or 42 inches. See Table 1 for qualified configurations.

3.3. Materials and Processes – The *Westbury*® Aluminum Railing system is an assemblage of extruded aluminum materials, extruded PVC rail inserts, tempered glass panels, austenitic (300 series) stainless steel fasteners, and cast Zamak 3 bracket materials.

3.3.1. The system is available in various colors and architectural grade powder coated finishes.

3.4. Components - The guardrail system includes a top rail, a mid-rail (*Riviera Series*), a bottom rail, vertical balusters, a structural aluminum post, rail-to-post brackets, a support block, and decorative moldings and post caps.

3.4.1. Rails - Each of the top, mid, and bottom aluminum rails are routed to accept various infill components described in Section 3.4.2 for the various railing systems as shown in Figure 1 through Figure 8

3.4.1.1. The top rail is an extruded 6005-T5 aluminum rail with internal longitudinal ribs, dimensions of 1.74 inches wide by 1.38 inches tall. The Tuscany and Riviera Series use a PVC rail insert as a baluster retainer. The Veranda Series uses a rubber insert as a glass infill retainer. See Figure 9.

3.4.1.2. The mid-rail is an extruded 6005-T5 aluminum rail with internal longitudinal ribs, dimensions of 1.74 inches wide by 1.25 inches tall. A PVC rail insert is used as a baluster retainer. See Figure 11.

3.4.1.3. The bottom rail is an extruded 6005-T5 aluminum rail with internal longitudinal ribs and is 1.74 inches wide by 1.25 inches tall. A PVC rail insert is used as a baluster retainer. See Figure 10.

3.4.2. The infill area for all styles, except the Veranda Series, utilize 6063-T52 aluminum balusters in various lengths (See Figure 14). The infill area of the Veranda Series Style C70 railing system (see Figure 8) utilize a ¼ inch thick tempered glass panel in various sizes.

3.4.3. The infill area of the *Riviera Series* Style C30R railing system (see Figure 3) is configured with 6063-T52 aluminum balusters and with tabbed 6063-T6 aluminum rings between the top and mid-rail. See Figure 15.

3.4.4. Structural Aluminum Posts:

3.4.4.1. *Power Posts* are a 2-1/2 inch square by 0.125 inch wall extruded 6005-T5 aluminum tube with internal screw slots. The tube is connected to a 4-1/2 inch square, 1/2 inch thick 6061-T6 aluminum base plate via both a 1/4 inch continuous fillet weld and six #14 by 2 inch flat-head screws. For the standard *Power Post,* see Table 2 and Figure 19. For the *Power Post* crossover assembly, see Table 2 and Figure 18.

3.4.4.2. The 4x4 aluminum post is a 4 inch square by 0.125 inch wall extruded 6063-T6 aluminum tube. The tube is permanently attached to a 6 inch square, 1/2 inch thick 6061-T6 aluminum base plate by a 1/4 inch continuous fillet weld. See Table 2 and Figure 20.

3.4.5. A support block is installed between the lower rail and the deck surface midway between supports. See Figure 16.

4.0 Performance Characteristics

4.1. The guardrail system described in this report has demonstrated the capacity to resist the design loadings specified in Chapter 16 of both the IBC and the FBC and Section R301 of the IRC when tested in accordance with ICC-ES AC273.

5.0 Installation

The guardrail system shall be installed in accordance with the Digger Specialties, Inc.'s installation instructions and this report. Where differences occur between this report and Digger Specialties, Inc.'s installation instructions, this report shall govern.

5.1. The top and bottom rails are attached directly to structural posts utilizing cast Zamak 3 mounting brackets via mechanical fasteners. See Figure 17 and Table 2.

5.2. Guards may be assembled in various configurations. Refer to Figure 1 through Figure 8 for overall assembly and Table 2 for the fastening schedule.

5.3. Infill components (aluminum balusters and aluminum rings) are inserted into routed holes in the aluminum rails and secured via PVC rail inserts that are installed internally to the rails. See Figure 12 and Figure 13.

5.4. The infill component for the Veranda Series (Style C70) consists of a glass panel which is inserted into the top rail and slides up, to clear bottom rail. The glass panel is aligned with the bottom insert and pushed down into that insert.

5.5. Two shim plates are utilized under the base of the structural post. Each shim plate is oriented so that its length is parallel with the line of the rail. The hardware used to anchor the base of the *Power Post* and 4x4 aluminum post to the supporting structure is installed so that it passes through the holes in the shim plates. *Power Post* shim plates are 4-1/2 inches long by 3/4 inch wide by 1/16 inch thick austenitic (300 series) stainless steel plates. The 4x4 aluminum post shim plates are 6 inches long by 3/4 inch wide by 0.06 inch thick austenitic (300 series) stainless steel plates.

6.0 Supporting Evidence

6.1. Drawings and installation instructions submitted by Digger Specialties, Inc.

6.2. Reports of testing demonstrating compliance with the performance requirements of ICC-ES AC273, Acceptance Criteria for Handrails and Guards, effective March 1, 2008 with additional testing including increased test loads to address IBC and FBC Section 2407.1.1 for assemblies that utilize a glass in-fill panel.

6.3. A quality control manual that is in accordance with the ICC-ES AC10, Acceptance Criteria for Quality Documentation, approved June 2011.

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. Attachment of guardrail systems described herein to conventional wood supports is outside the scope of this report.

7.2. Shim plates must be used for all structural post installations as described in Section 5.5.

7.3. Anchorage of the structural post is not within the scope of this report and is 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:

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

7.3.2. The anchors must have a minimum nominal diameter equal to 3/8 inch.

7.3.3. 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.

7.3.4. Where required by the building official, engineering calculations and details shall be provided. The calculations shall verify that the anchorage and supporting structure complies with the building code for the type and condition of the supporting construction.

7.4. The austenitic (300 series) stainless steel shim plates are used to prevent direct contact between the structural post base plate and supporting structure. Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is outside the scope of this report.

7.5. The glass infill panel of guards is considered a hazardous location as defined by Sections 2406.4 of the IBC and 2406.3 of the FBC. Glass must be identified by permanent etching as required by Sections 2406.3 of the IBC and 2406.2 of the FBC. Each section of glass must bear the manufacturer's name or mark and the applicable test standard. (Class A of ANSI Z97.1 and Category II of 16 CFR 1201).

7.6. Guards utilizing glass infill are not approved for use in wind-borne debris regions as defined by the IBC in accordance with Section 2407.1.4. Thus, glass balusters are also not approved for use in the High Velocity Hurricane Zone (HVHZ) under the FBC.

7.7. Digger Specialties, Inc. manufactures the *Westbury*® Aluminum Railing system in Bremen, Indiana in accordance with an approved quality control system that includes independent third party inspections by NTA, Inc (IAS AA-682).

8.0 Identification

The *Westbury*® Aluminum Railing guardrail assemblies that are described in this report shall be identified with labeling on the individual components and/or the packaging such that the product is identifiable at the point of use. The label shall include at least the following information:

8.1. Name and/or trademark of Digger Specialties, Inc.

8.2. The name and/or identifying mark of the independent inspection agency (NTA Inc.).

8.3. For 36" high guardrail systems, the label shall also include the phrase, "For Use in One- and Two-Family Dwellings Only."

8.4. The Architectural Testing Code Compliance Research Report mark and number (CCRR-0163).

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.ati-es.com is recommended to ascertain the current version and status of this report.

Table 1 – Guardrail Systems and Use Categories

Westbury® Aluminum Railing System	Guardrail Type	Code Occupancy Classification [1]			
		IBC	IRC	FBC	FBC-Residential
Tuscany Series & Riviera Series	Level	8' x 42"	8' x 36" [2] 8' x 42"	8' x 42"	8' x 36" [2,4] 8' x 42"
Veranda Series	Level	6' x 42" [3]	6' x 36" [2,3] 6' x 42" [3]	6' x 42" [3,4]	6' x 36" [2,3,4] 6' x 42" [3,4]

[1] Guardrails are qualified up to and including the listed maximum guardrail system dimensions for use in the referenced Code Occupancy Classification.

[2] The use of this product shall be limited to exterior use as a guard system for balconies and porches for one- and two-family dwellings of Type V-B (IBC, FBC) construction in accordance with the IRC or FBC-Residential.

[3] Excluding wind-borne-debris regions

[4] Excluding High-Velocity-Hurricane-Zone (HVHZ)

Table 2 – Fastener Schedule

Connection	Fastener
All Rail Brackets to Post	Two #10-16 x 5/8 in pan-head, self-drilling, 18-8, 300 Series screws [2]
Crossover Assembly to Top Rail	
Top Rail and Mid-Rail Bracket to Rail	Two #10-15 x 1 in flat-head, self-drilling, 18-8, 300 Series screws [2] (one through each side hole)
Bottom Rail Bracket to Rail	No mechanical fastener
Support Block Screw to Bottom Rail	One #8-18 x 3/4 in pan-head, self-drilling, zinc-plated 18-8, 300 Series screw [2]
Power Post Base Plate to Structural Post Tube	Six #14-14 x 2 in flat-head, self-drilling, 18-8, 300 Series screws [1,2]

[1] *Power Posts* are supplied with fasteners pre-installed.

[2] Permissible grades of the 300 Series stainless steel material include: 304, 305, 316, 384, and/or XM7 (30430), which are all Austenitic Stainless Steel – Cold Worked materials.

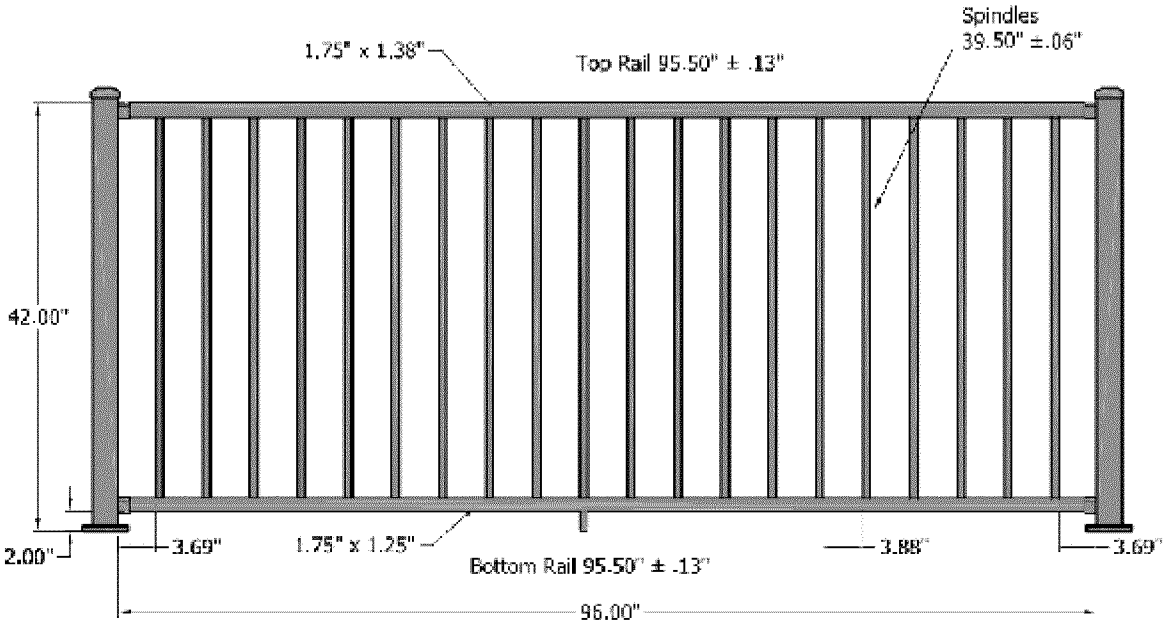


Figure 1
***Westbury® Tuscany Series* Style C10 Aluminum Railing System**

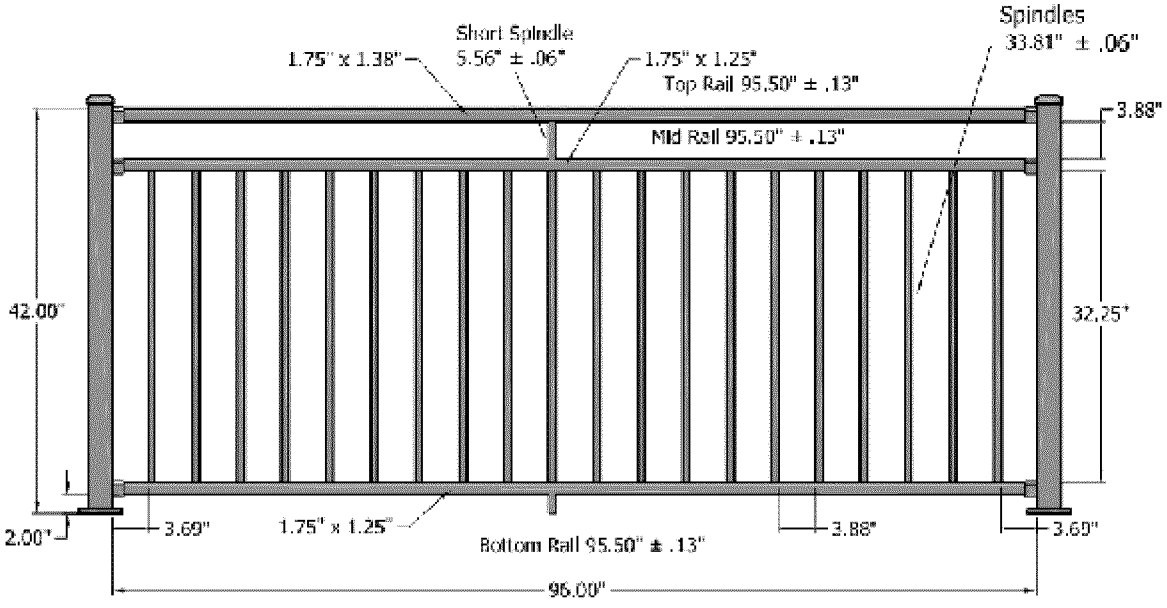


Figure 2
***Westbury® Riviera Series* Style C30 Aluminum Railing System**

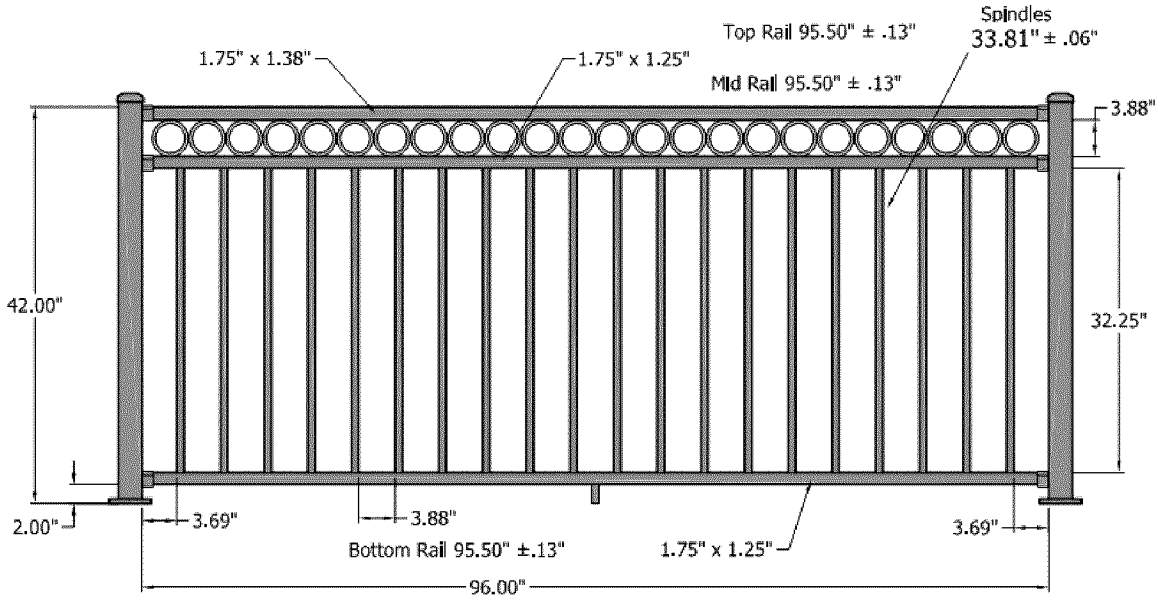


Figure 3
***Westbury® Riviera Series* Style C30R Aluminum Railing System**

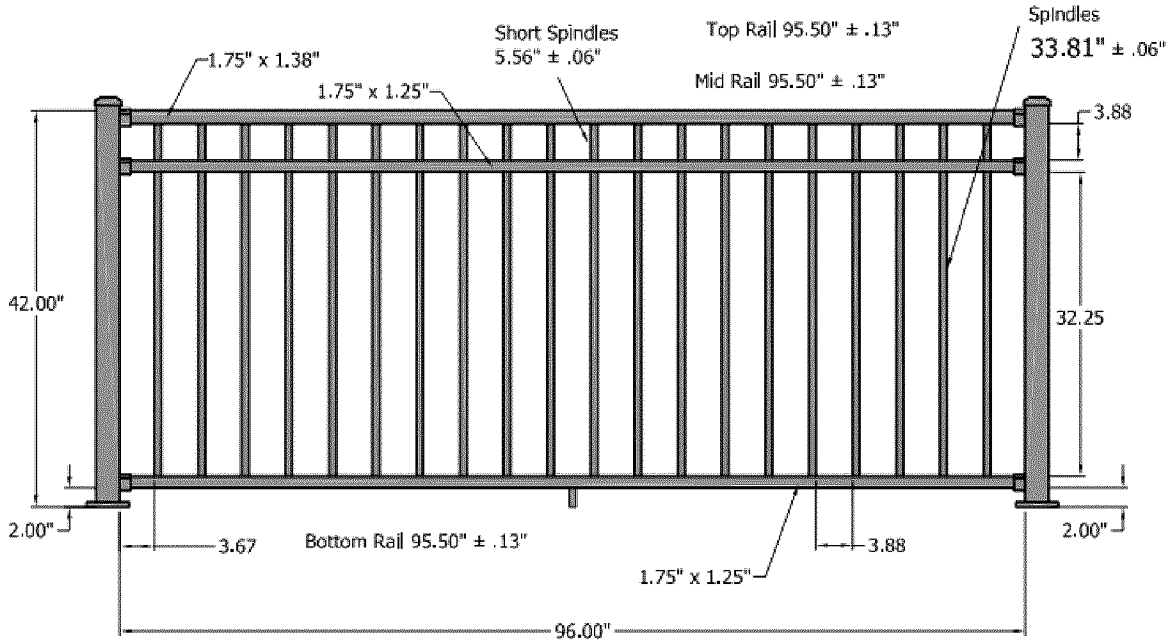


Figure 4
***Westbury® Riviera Series* Style C31 Aluminum Railing System**

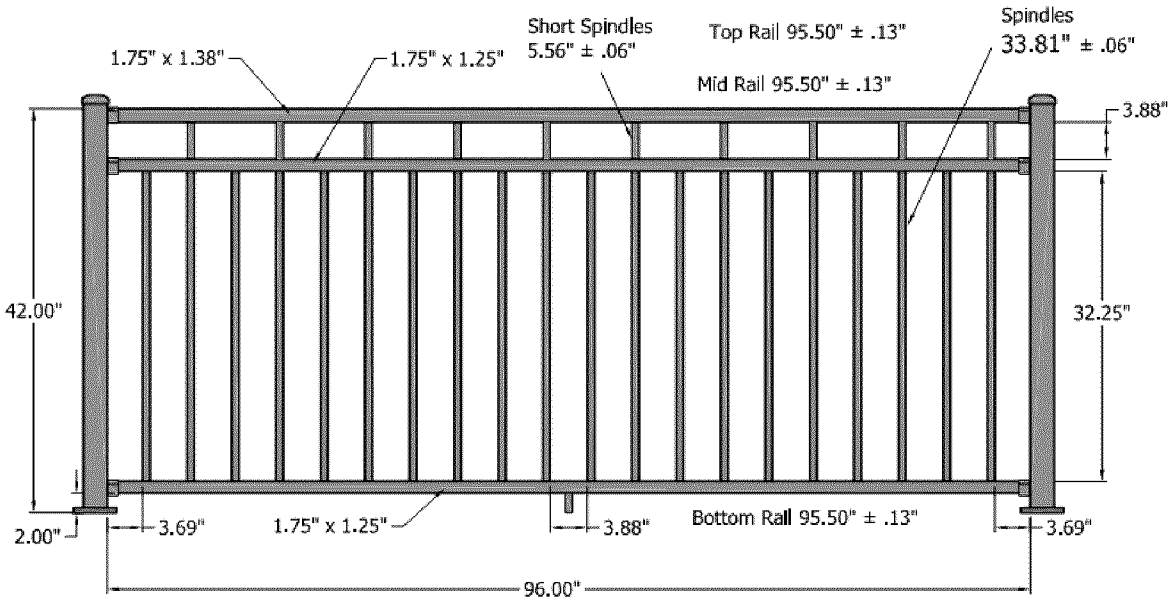


Figure 5
***Westbury® Riviera Series* Style C32 Aluminum Railing System**

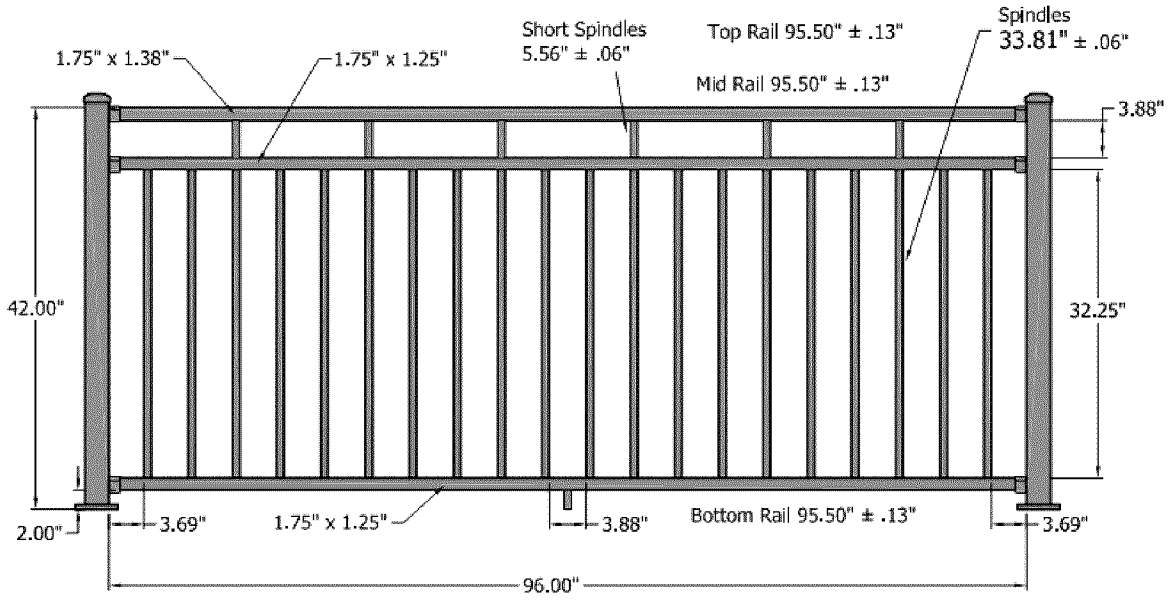


Figure 6
***Westbury® Riviera Series* Style C33 Aluminum Railing System**

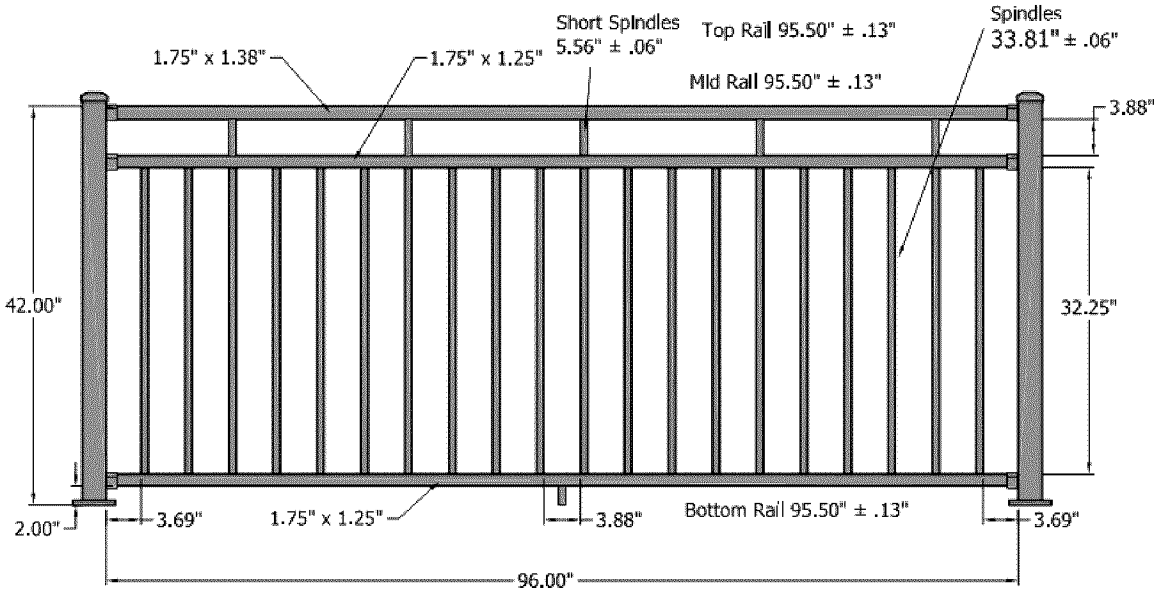


Figure 7
***Westbury® Riviera Series* Style C34 Aluminum Railing System**

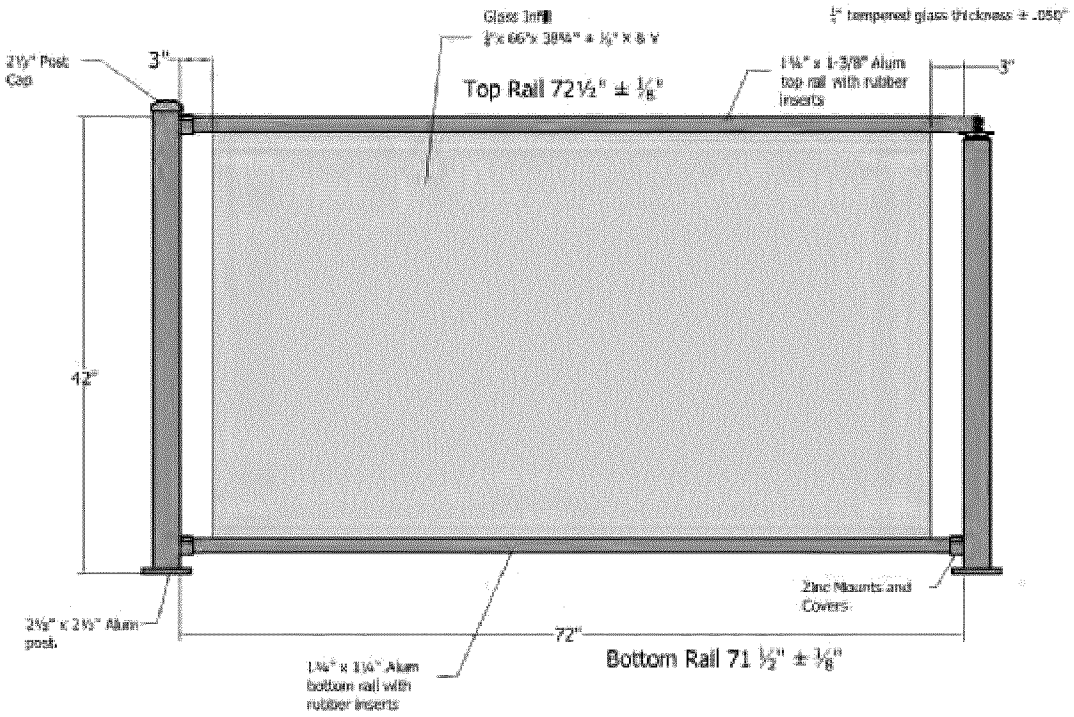
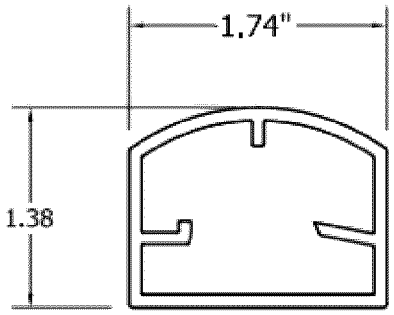
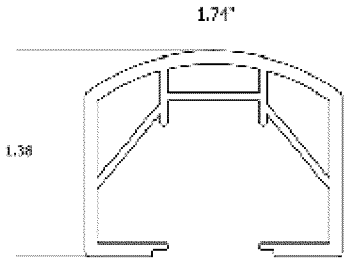


Figure 8
***Westbury® Veranda Series* Style C70 Glass Railing System**

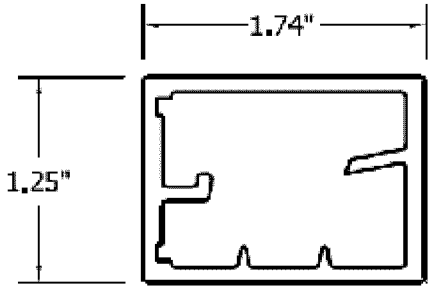


Tuscany and *Riviera Series*

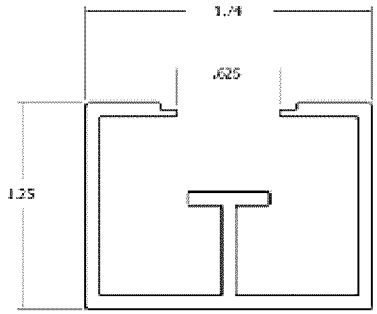


Veranda Series

Figure 9 – Top Rail profiles



Tuscany and *Riviera Series*



Veranda Series

Figure 10 – Bottom Rail profiles

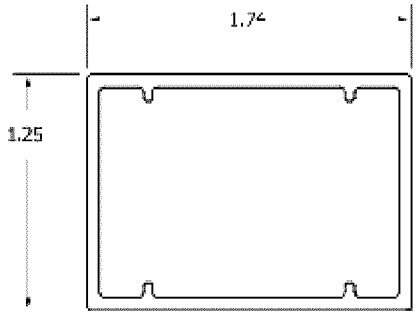
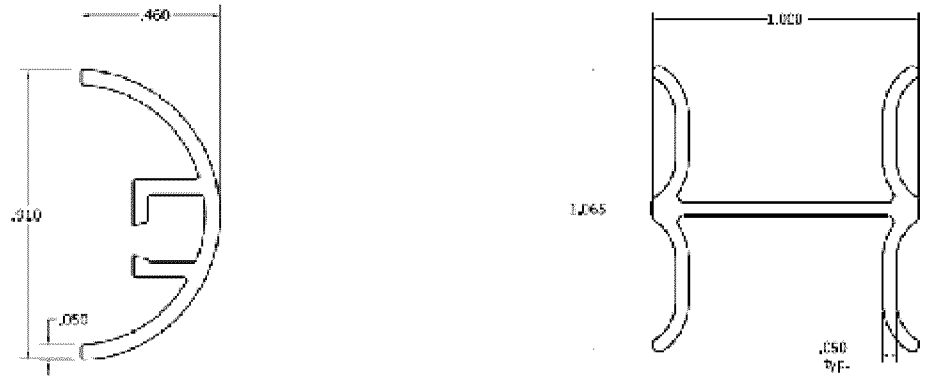
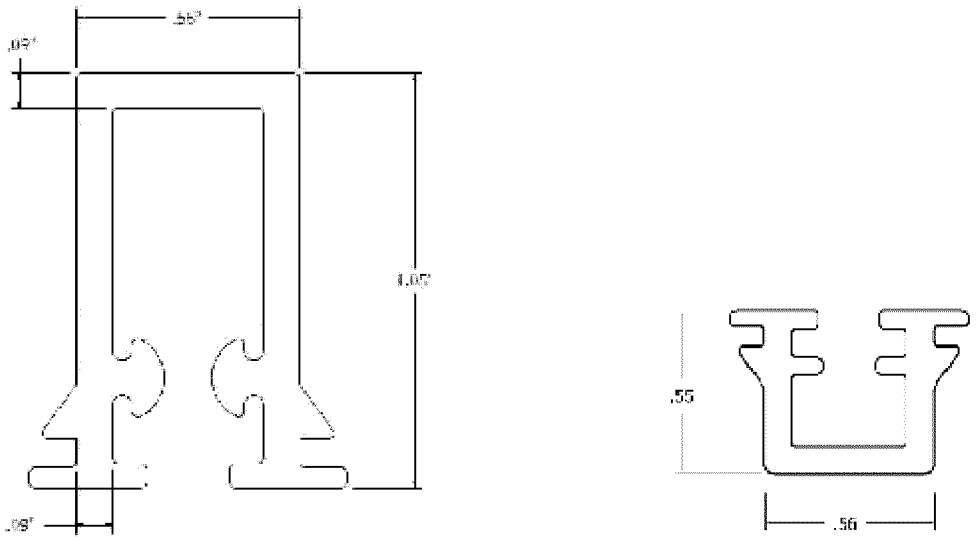


Figure 11 – Mid-Rail profile (*Riviera Series* only)



for Top and Bottom Rails for Mid-Rail

Figure 12 – *Tuscany* and *Riviera Series* PVC Inserts for aluminum balusters



for Top Rails for Bottom Rails

Figure 13 – *Veranda Series* Rubber Inserts for glass infill

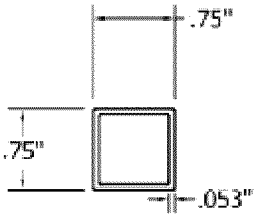


Figure 14 – Aluminum Balusters

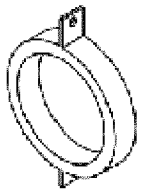


Figure 15 – Tabbed Ring (*Riviera Series*)

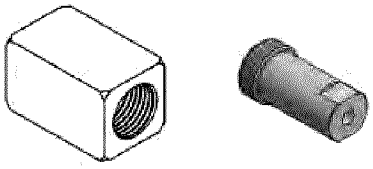


Figure 16 - Support Block Components

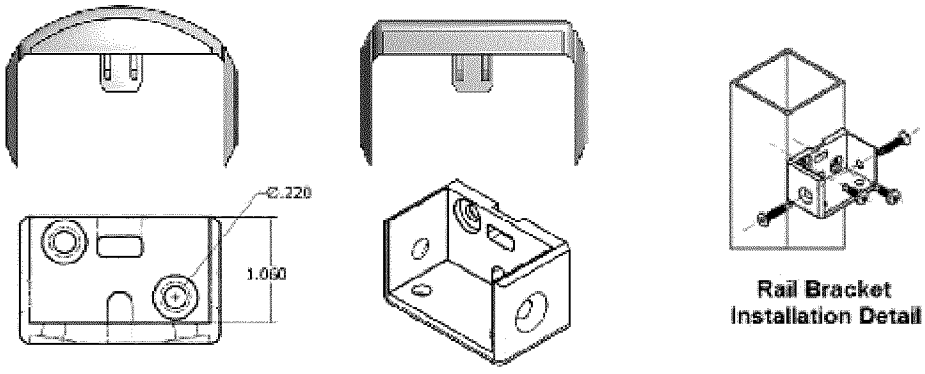


Figure 17 – Zamak 3 Cast Bracket Components

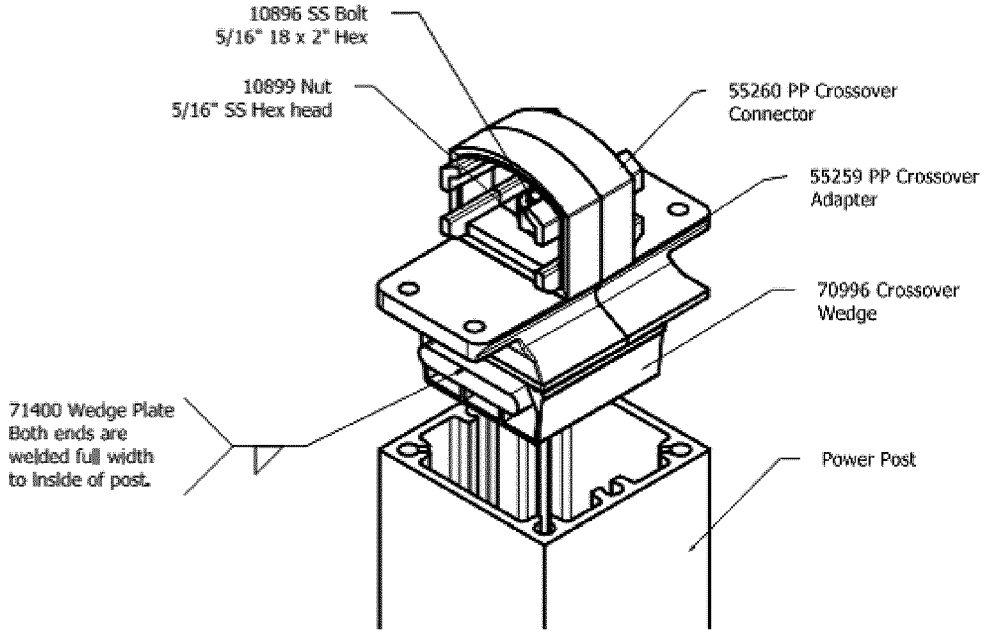


Figure 18 – *Power Post* Crossover Assembly

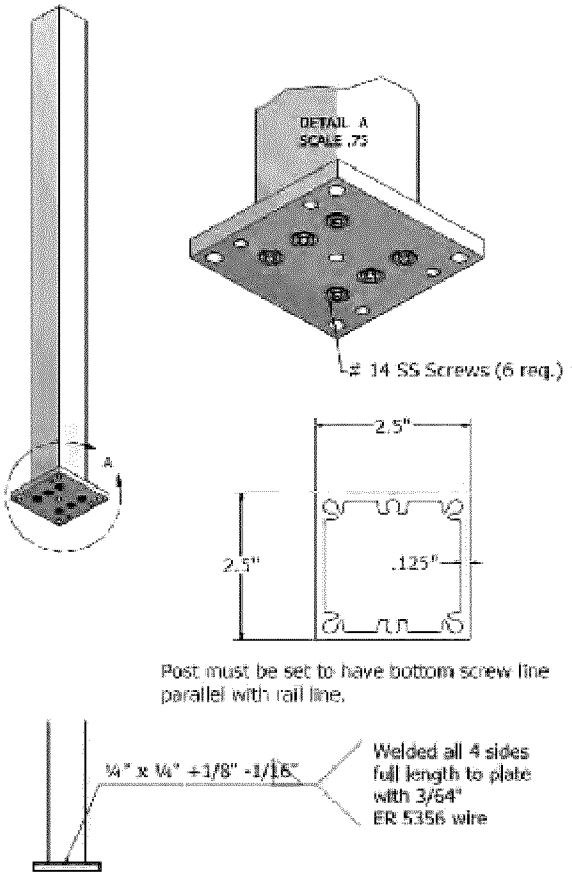


Figure 19 – 2-1/2" *Power Post* Assembly

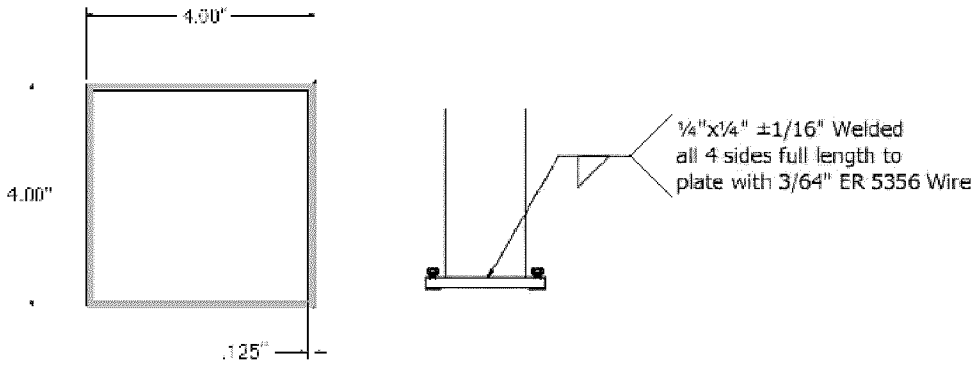


Figure 20 – 4x4 Aluminum Post Assembly

Code Compliance Research Report CCRR-0214

Subject to Renewal: 10/10/2015
Visit www.ati-es.com for current status
Issued: 10/10/2014

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www.diggerspecialties.com

1.0 Subject

Westbury® Aluminum Railing Liberty S10

2.0 Research Scope

2.1. Building Codes:

2012 International Residential Code (IRC)

2.2. Properties:

Structural Performance

3.0 Description

3.1. General – The *Westbury® Aluminum Railing Liberty S10* railing system is a guard or guardrail under the definitions of the referenced codes. It is intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the codes.

3.2. Guard Assemblies – Guards are provided as level guards for level walking areas such as decks, balconies, and porches. Level guards are provided with rail lengths up to 96 inches in length (measured between the inside of support posts) and an installed height of 42 inches. See Table 1 for qualified configurations.

3.3. Materials and Processes - The *Westbury® Aluminum Railing Liberty S10* railing system is an assemblage of extruded aluminum materials, stainless steel fasteners, and cast Zinc bracket materials.

3.4. Components - The guardrail system includes a top rail, bottom rail, balusters, structural aluminum post, rail-to-post brackets, and decorative moldings and post caps.

3.4.1. Rails - Each of the top and bottom aluminum rails are routed to accept various infill components described in Section 3.4.2.

3.4.1.1. The top rail is an extruded aluminum rail with internal longitudinal ribs, dimensions of 1.74 inches wide by 1.38 inches tall. See Figure 1. A PVC rail insert is used as a baluster retainer.

3.4.1.2. The bottom rail is an extruded aluminum rail with internal longitudinal ribs, dimensions of 1.74 inches wide by 1.25 inches tall. See Figure 2. A PVC rail insert is used as a baluster retainer.

3.4.2. The infill area utilizes 5/8 inch square aluminum balusters. See Figure 4. Rails are routed to the shape of the baluster profile to receive balusters.

3.4.3. Aluminum post mounts used with the *Westbury® Aluminum Railing Liberty S10* railing systems are a 2 inch square by 0.093 inch thick wall extruded aluminum tube with two internal screw channels. The tube is connected to a 3.88 inch square, ½ inch thick aluminum base plate via both a ¼ inch continuous fillet weld and two #14 (¼ inch major diameter), 2 inch long sheet metal screws. See Figure 7.

3.4.4. A rail support is installed between the lower rail and the deck surface midway between supports. See Figure 5.

4.0 Performance Characteristics

4.1. The guardrail system described in this report has demonstrated the capacity to resist the design loadings specified in Section R301 of the IRC when tested in accordance with ICC-ES AC273.

5.0 Installation

The guardrail system shall be installed in accordance with the Digger Specialties' installation instructions and this report. Where differences occur between this report and the manufacturer's installation instructions, this report shall govern.

5.1. The top and bottom rails are attached directly to structural posts utilizing cast Zinc mounting brackets via mechanical fasteners. See Figure 6 and Table 2.

5.2. Aluminum balusters are inserted into routed holes in the aluminum rails and secured via PVC rail inserts that are installed internally to the rails.

5.3. The 2" square aluminum posts must be installed with the two internal screw channels perpendicular with the rail line. See Figure 7.

5.3.1. Two shim plates are utilized under the base of the 2 inch aluminum post mount. The shim plates line the perimeter of the post base. Shim plates are 3.88 inches long by 0.75 inches wide by 0.06 inch thick austenitic stainless steel plates.

6.0 Supporting Evidence

6.1. Drawings and installation instructions submitted by Digger Specialties, Inc.

6.2. Reports of testing demonstrating compliance with the performance requirements of ICC-ES AC273, Acceptance Criteria for Handrails and Guards, effective March 1, 2008 (editorially revised Jan. 2012).

6.3. A quality control manual that is in accordance with the ICC-ES AC10, Acceptance Criteria for Quality Documentation, approved June 2014.

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. Attachment of guardrail systems described herein to conventional wood supports is outside the scope of this report.

7.2. The austenitic stainless steel shim plates are used to prevent direct contact between the structural post base plate and the supporting structure. Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is outside the scope of this report.

7.3. Anchorage of the structural post is not within the scope of this report and is subject to evaluation and approval by the building official. Anchors must meet the following minimum requirements:

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

7.3.2. The anchors must have a minimum nominal diameter equal to 3/8 inch.

7.3.3. 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.

7.3.4. Where required by the building official, engineering calculations and details shall be provided. The calculations shall verify that the anchorage and supporting structure complies with the building code for the type and condition of the supporting construction.

7.4. The *Westbury® Aluminum Railing Liberty S10* railing system is manufactured in Bremen, Indiana accordance with an approved quality control system that includes independent third party inspections by NTA, Inc. (IAS AA-682).

8.0 Identification

The *Westbury® Aluminum Railing Liberty S10* railing guardrail assemblies that are described in this report shall be identified with labeling on the individual components and/or the packaging such that the product is identifiable at the point of use. The label shall include at least the following information:

8.1. Name and/or trademark of the manufacturer

8.2. The name and/or identifying mark of the independent inspection agency.

8.3. The label shall also include the phrase: "For Use in One- and Two-Family Dwellings Only".

8.4. The Architectural Testing Code Compliance Research Report mark and number (CCRR-0214).

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.ati-es.com is recommended to ascertain the current version and status of this report.

Table 1 – Code Occupancy Classification

Guardrail System	Type	Maximum Guardrail Dimensions [1]	Support Post Mount System	Code Occupancy Classification
Westbury® Aluminum Railing Liberty S10	Level	96 inches by 42 inches [2]	2 inch Aluminum Post Mount [3] (Figure 7)	The use of this product shall be limited to exterior or interior use as a guard system for balconies and porches for dwellings constructed in accordance with the IRC.

[1] Guardrails are qualified up to and including the listed maximum guardrail system dimensions for use in the referenced Code Occupancy Classification. Guardrail lengths are actual railing lengths, i.e. clear space between supports for level rails. Guardrail height is walking surface to top of top rail. Minimum installed height shall be 36 inches.

[2] Level rails utilize one rail support (Figure 5) located at the mid-span, between the walking surface and the bottom rail.

[3] The supporting structure (wood deck or concrete) is not within the scope of this report. Refer to Section 7.3.

Table 2 – *Westbury® Aluminum Railing Liberty S10* Fastener Schedule

Connection	Fastener	Quantity
Top/Bottom Rail Bracket to Post	#10-16 x 5/8 inch (0.133 inch minor diameter), pan-head, self-drilling, stainless[2] steel screw	4
Top Rail Bracket to Rail [1]	#10-16 x 5/8 inch (0.133 inch minor diameter), pan-head, self-drilling, stainless[2] steel screw	1
Rail Support to Bottom Rail	#10-16 x 5/8 inch (0.133 inch minor diameter), pan-head, self-drilling, stainless[2] steel screw	2

[1] Bottom rail to bracket connections do not require fasteners. Bottom rails are slide into place within the bottom rail brackets.

[2] Permissible grades of the stainless steel material include: 304, 305, 316, 384, or XM7 (30430), which are all Austenitic Stainless Steel – Cold Worked materials.

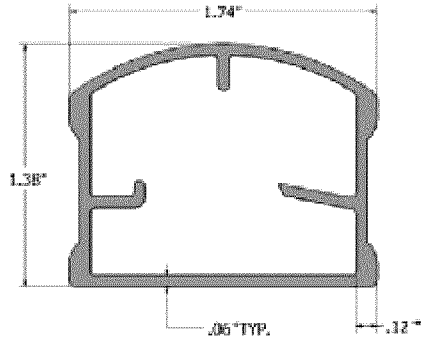


Figure 1 – Top Rail

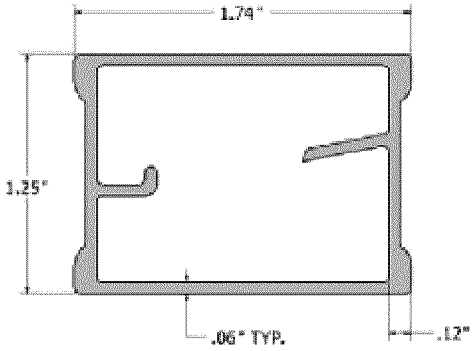


Figure 2 – Bottom Rail

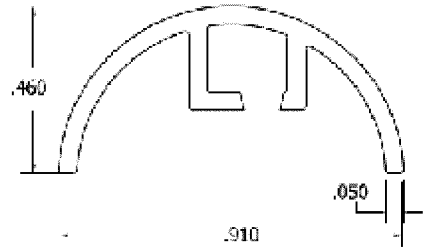


Figure 3 –Top and Bottom Rail PVC Insert

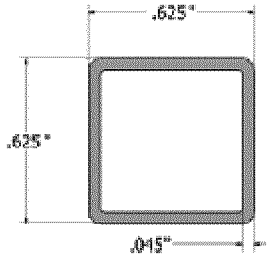


Figure 4 – Aluminum Baluster

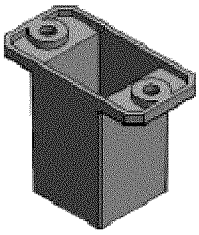
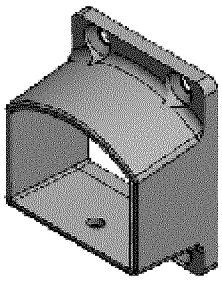
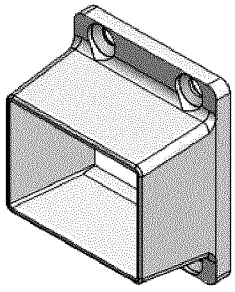


Figure 5 – Rail Support



Top Mount



Bottom Mount

Figure 6 – Rail Mounting Brackets

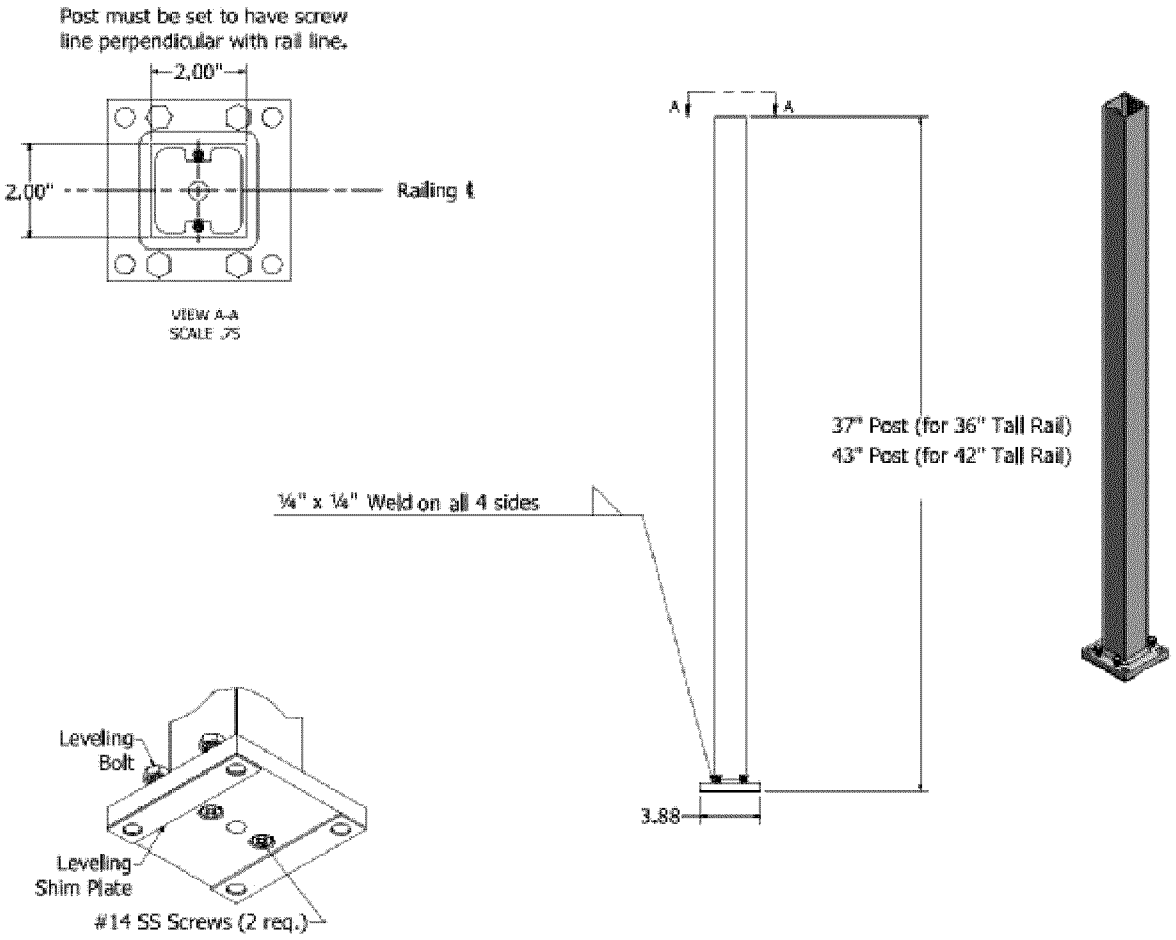


Figure 7 – 2 inch square Aluminum Support Post

Code Compliance Research Report CCRR-0147

Digger Specialties, Inc.
3446 US 6 East
Bremen, IN 46506
(574) 546-5999

www.diggerspecialties.com

1.0 Subject

PolyRAIL Systems TRX Vinyl Guardrail System

2.0 Research Scope

2.1. Building Codes:

2012 International Building Code (IBC)

2012 International Residential Code (IRC)

2010 Florida Building Code (FBC) - Excluding High-Velocity Hurricane Zones

2.2. Properties:

Structural Performance

Durability

Surface Burning

Decay Resistance

Termite Resistance

3.0 Description

3.1. General – The TRX Vinyl Guardrail Systems described in this report 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. Guardrail systems include a top and bottom rail, with aluminum inserts, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings.

3.3. Rails, post sleeves, foot blocks, balusters and decorative moldings are extruded Polyvinyl Chloride (PVC) produced in a single color; White.

3.4. All top rails are provided with an aluminum insert with a 'T' profile. All bottom rails are provided with an aluminum insert with a 'U' profile. All rail inserts are extrusions of 6063-T6 aluminum. See Figure 2.

3.5. Level guards with heights of up to 42 inches above the floor surface are provided in lengths up to 8 feet as measured from inside-to-inside of supports.

3.6. The top assembly consists of one rail, and is attached to each support with a single PVC bracket. The top rail is a 'T' profile and is 1.75 inches high by 3.25 inches wide See Figure 1.

3.7. The bottom assembly consists of one rail, and is attached to each support with a single PVC bracket. The bottom rail is 1.75 inches square. See Figure 1.

3.8. Balusters are extruded PVC and are 1.375 inches square. The balusters are placed through routed openings in both the top and bottom rails to provide a means for securing the balusters in the rails.

3.9. The baluster spacing resulting from assemblies recognized in this report shall provide spacing such that a 4 inch diameter sphere cannot pass through any opening between balusters.

3.10. Post sleeves are 4 inches square and have a wall thickness of 0.16 inch.

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 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 35 when tested according to ASTM E 84. The referenced criteria within AC174, requires a flame spread index not exceeding 200 when tested in accordance with ASTM E 84.

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 rail assemblies are attached to PVC sleeved conventional wood posts or other supporting structure with a mounting bracket. See Figure 3.

5.3. One mounting bracket attaches to each end of the upper rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using two (2) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.4. One mounting bracket attaches to each end of the lower rail using two (2) #8 by 0.75 inch, self-drilling, pan-head screws. The brackets are attached to the supports using four (4) #12 by 1.25 inch, thread-cutting, Type 17, pan-head screws.

5.5. Foot blocks are intermediate bottom rail supports and are installed between the deck surface and the rail at the mid-point of the rail and consist of a 2.0 inch section of baluster and a 1.312 inch by 0.625 inch HDPE block. The HDPE block is attached to the bottom rail utilizing two (2) #12 by 1.25 inch thread cutting screws. The baluster section is attached to the HDPE block utilizing two (2) #8 by 0.75 inch self-drilling screws.

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.

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 January 2012.

6.3. The reports of testing and engineering analysis demonstrating compliance with the performance requirements ASTM D 7032-08, 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", effective December, 2012..

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. Guards recognized in this report and regulated by the IBC or IRC are limited to exterior use in all construction types where wood is permitted in accordance with Section 1406.3 of the IBC and in One and Two Family Dwellings regulated by the IRC.

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 (See 5.6 under "Installation"). Where required by the building official, engineering calculations and details prepared by a licensed design professional shall be provided.

7.3. Skewed mounting bracket connections to supports are not within the scope of this report and are subject to evaluation and approval by the building official.

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

7.5. All products are manufactured in Bremen, Indiana by Digger Specialties, Inc. in accordance with the manufacturer's approved quality control system with inspections by NTA, Inc. (AA-682.)

ES REPORT™

ESR-1324

Issued June 1, 2005

This report is subject to re-examination in one year.

ICC Evaluation Service, Inc.
www.icc-es.org

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DIVISION: 06—WOOD AND PLASTICS
Section: 06610—Plastic Railings and Guards

REPORT HOLDER:

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POST OFFICE BOX 241
BREMEN, INDIANA 46506
(574) 546-5999
www.diggerspecialties.com
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EVALUATION SUBJECT:

FALCON RAILING SYSTEM, RAVEN RAILING SYSTEM AND LXT RAILING SYSTEM

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2003 *International Building Code*® (IBC)
- 2003 *International Residential Code*® (IRC)

Properties evaluated:

- Structural
- Durability
- Surface-burning characteristics

2.0 USES

The Falcon Railing System, Raven Railing System and LXT Railing System described in this report are limited to exterior use as guardrail systems for balconies, porches, and decks of Group R Occupancy buildings of Type V-B construction (IBC) and structures constructed in accordance with the IRC.

3.0 DESCRIPTION

3.1 General:

The Falcon Railing System, Raven Railing System and LXT Railing System are fabricated and assembled from poly(vinyl-chloride) (PVC) components, fasteners, injected molded components and an aluminum post insert. The Falcon Railing System, Raven Railing System and LXT Railing System are manufactured in two colors, white and tan.

3.2 Falcon Railing System:

The Falcon Railing System is manufactured with a height of 42 inches (1067 mm) and a center-of-post-to-center-of-post length of 100 inches (2540 mm) [rail length of 96 inches (2438 mm)]. The top rail is a combination of a $2^1/_2$-by-$3^1/_2$-inch (64 by 89 mm) bread loaf–shaped PVC cover with a wall thickness of $^1/_8$ inch (3.2 mm), and a $1^1/_2$-by-$3^3/_{16}$-inch (37 by 81 mm) 6063-T6 extruded aluminum p-shaped insert with a thickness of 0.070 inch (1.8 mm). The bottom rail is comprised of a $1^3/_4$-by-$3^1/_2$-inch (44 by 89 mm) PVC cover with a wall thickness of 0.12 inch (3.0 mm) and the same p-shaped aluminum insert utilized in the top rail. The PVC balusters are $1^3/_8$ inches (35 mm) square with a wall thickness of 0.080 inch (2.0 mm). The post is comprised of a 4-by-4-inch (102 by 102 mm) square PVC cover with a 6061-T6 and 6063-T6 extruded aluminum post-insert assembly. The factory-assembled post-insert is comprised of a series of plates, bolts, and components assembled as described in the quality control manual. See Figures 1 and 6 for typical component cross sections and post insert assembly.

3.3 Raven Railing System:

The Raven Railing System is manufactured with a height of 42 inches (1067 mm) and a center-of-post-to-center-of-post length of 88 inches (2540 mm) [rail length of 84 inches (2438 mm)]. The top rail is a combination of a $3^1/_4$-by-$1^3/_4$-inch (83 by 44 mm) "T" shaped PVC cover with a wall thickness of 0.090 inch (2.3 mm), and an approximate 3-by-$1^1/_2$-inch (80 by 37 mm) 6063-T6 extruded aluminum "T" shaped insert with a thickness of 0.070 inch (1.8 mm). The bottom rail is comprised of a $1^3/_4$-by-$1^3/_4$-inch (44 by 44 mm) PVC cover with a wall thickness of 0.080 inch (2.0 mm) and a 1.525-inch-square (39 mm) U-shaped 6063-T6 extruded aluminum insert with a wall thickness of 0.078 inch (2.0 mm). The PVC balusters measure $^7/_8$ inch by $1^1/_2$ inches (22.2 by 38 mm) and have a wall thickness of 0.070 inch (2.0 mm). The post sleeve and the post insert assembly are of the same configuration as described for the Falcon Railing System. See Figures 2 and 6 for typical component cross sections and post insert assembly.

3.4 LXT Railing System:

The LXT Railing System is manufactured with a height of 42 inches (1067 mm) and a center-of-post-to-center-of-post length of 100 inches (2540 mm) [rail length of 96 inches (2438 mm)]. The top rail is the same combination of components as described for the top rail of the Raven Railing System. The bottom rail is the same combination of components as described for the bottom rail of the Falcon Railing System. The balusters, the post sleeve and the post insert assembly are the same as described for the Falcon Railing System. See Figures 1, 2 and 6 for typical component cross sections and post insert assembly.

3.5 Durability:

When subjected to weathering, insect attack, and other decaying elements, material used to manufacture the Falcon Railing System, Raven Railing System and LXT Railing System are equivalent in durability to preservative-treated or naturally durable lumber when used in locations described in Section 2.0 of this report. The products have been evaluated for a temperature range from -20°F (-29°C) to 125°F (52°C).

3.6 Surface-burning Characteristics:

When tested in accordance with ASTM E 84, the Falcon Railing System, Raven Railing System and LXT Railing System have a flame-spread index no greater than 200.

4.0 DESIGN AND INSTALLATION

4.1 General:

Installation of the Falcon Railing System, Raven Railing System and LXT Railing System shall comply with this report and the manufacturer's published installation instructions. The manufacturer's published installation instructions shall be available at the jobsite at all times during installation.

4.2 Guardrail System:

4.2.1 Falcon Railing System: The post insert and the top and bottom rail inserts of the Falcon Railing System shall be installed as described in the manufacturer's published installation instructions. The reinforced top and bottom rails of the Falcon Railing System shall be attached to the post sleeve (with post insert) utilizing the top and bottom rail bracket mounts. Each mount is fastened to the post with four No. 12 by $1^1/_4$-inch-long (32 mm) screws that are provided with the system. An additional two $^3/_4$-inch-long (19 mm) screws are installed through the mount into the top and bottom rails as indicated in the manufacturer's published installation instructions. Each baluster is slip-fitted into the routed holes located in the top and bottom rails prior to the attachment of the top rail to the post. Balusters shall be spaced a maximum of 5 inches (127 mm) on center. See Figure 3 for a typical Falcon Railing System assembly.

4.2.2 Raven Railing System: The Raven Railing System is assembled in a similar manner as described for the Falcon Railing System. See Figure 4 for a typical Raven Railing System assembly.

4.2.3 LXT Railing System: The LXT Railing System is assembled in a similar manner as described for the Falcon Railing System. See Figure 5 for a typical LXT Railing System assembly.

4.2.4 Post Insert Assembly: The aluminum post insert assembly is preassembled in the factory with components comprised of material as described in the quality control manual. When fastening the aluminum post insert assembly to supporting construction consisting of concrete, the post base shall be fastened with four corrosion-resistant $^1/_4$-by-3-inch-long (6.4 by 76 mm) self-tapping concrete screws. When fastening the aluminum post insert assembly to supporting construction consisting of wood, the post base shall be fastened with four stainless steel $^1/_4$-inch-diameter (6.4 mm) screws/bolts.

4.2.5 Structural: The Falcon Railing System, Raven Railing System and LXT Railing System will resist the loads specified in the applicable codes when installed at a maximum center-to-center post spacing as prescribed in Table 3 of this report. When a guardrail is supported on one or both ends by the supporting construction other than a post with the aluminum insert, the maximum distance shall be measured from edge-of-structure to edge-of-structure at a maximum distance as indicated in Table 1.

5.0 CONDITIONS OF USE

The Falcon Railing System, Raven Railing System and LXT Railing System 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 use of the Falcon Railing System, Raven Railing System and LXT Railing System shall be limited to exterior use as a guardrail system for balconies, porches and decks of Group R Occupancy buildings of Type V-B construction (IBC) and structures constructed in accordance with the IRC.

5.2 Installation shall 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 Falcon Railing System, Raven Railing System and LXT Railing System. When the manufacturer's published installation instructions differ from this report, this report shall govern.

5.3 The compatibility of the fasteners, metal post mount components and other metal hardware with the supporting construction, including chemically treated wood, is outside the scope of this report.

5.4 The use of the PVC post sleeve installed over inserts other than those described in this report are outside the scope of this report.

5.5 The use of the Falcon Railing System, Raven Railing System and LXT Railing System as handrails is outside the scope of this report.

5.6 Adjustment factors outlined in the NDS and applicable codes shall not apply to the allowable capacity and maximum spans for the Falcon Railing System, Raven Railing System and LXT Railing System.

5.7 The Falcon Railing System, Raven Railing System and LXT Railing System shall be directly fastened to supporting construction. Where required by the code official, engineering calculations and construction documents consistent with this report shall be submitted for approval. The calculations shall 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 shall contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents shall be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.8 The lineal PVC components (top rail, bottom rail, post sleeve and balusters) used in the Falcon Railing System, Raven Railing System and LXT Railing System are manufactured by Westech Fence, under a quality control program evaluated under ICC-ES evaluation report NER-710.

5.9 The Falcon Railing System, Raven Railing System and LXT Railing System are fabricated and packaged in Bremen, Indiana, under a quality control program with inspections by NTA, Inc. (AA-682).

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 April 2002 (editorially revised July 1, 2004; corrected December, 2004).

7.0 IDENTIFICATION

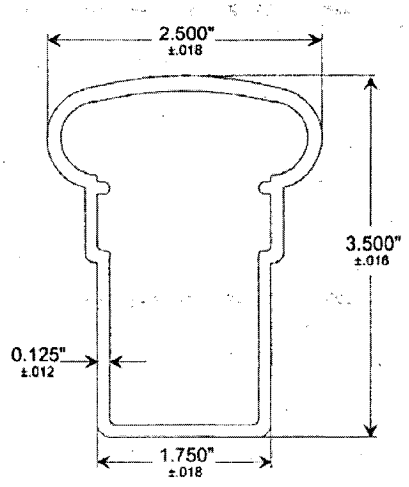
The Falcon Railing System, Raven Railing System and LXT Railing System described in this report shall be identified on each package by a stamp bearing the manufacturer's name (Digger Specialities, Inc.), the product type, the name of the third-party inspection agency (NTA Inc.) and the ICC-ES evaluation report number (ESR-1324).

TABLE 1—MAXIMUM GUARDRAIL SYSTEM SPANS[3,4]

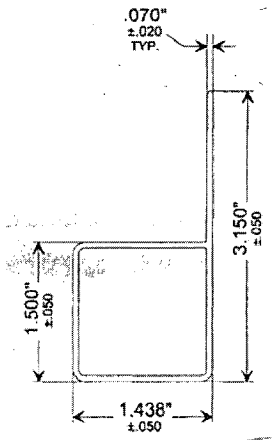
PRODUCT NAME/COMPONENT	APPLICABLE BUILDING CODE[5]		MAXIMUM SPAN (ft-in)[1]	
	IBC	IRC	With Post[1]	Without Post[2]
Falcon Railing System	Yes	Yes	8'-4"	8'-0"
Raven Railing System	Yes	Yes	7'-4"	7'-0"
LXT Railing System	Yes	Yes	8'-4"	8'-0"

For **SI:** 1 inch = 25.4 mm; 1 ft = 305 mm.

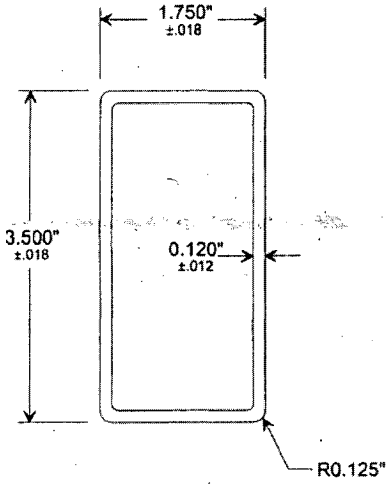
[1]Maximum span is measured center-to-center of the posts or edge-of-structure to the center of the post.
[2]Maximum span is measured from edge-of-structure to edge-of-structure.
[3]Maximum allowable span is adjusted for durability. No further increases are permitted.
[4]The ability of the supporting construction to resist the reactionary loads shall be confirmed by the code official.
[5]Indicates compliance with the respective building codes.



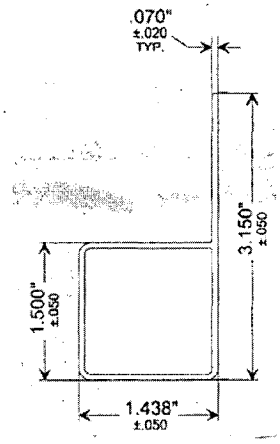
TOP RAIL
(FALCON SYSTEM ONLY)



TOP RAIL INSERT
(FALCON SYSTEM ONLY)
Shown in inverted orientation)



BOTTOM RAIL



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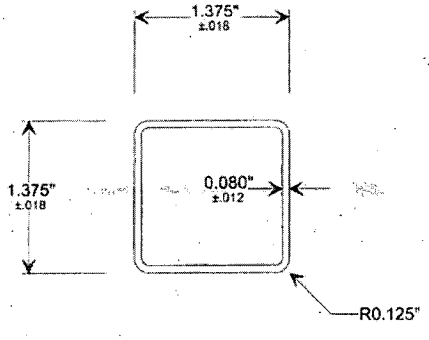
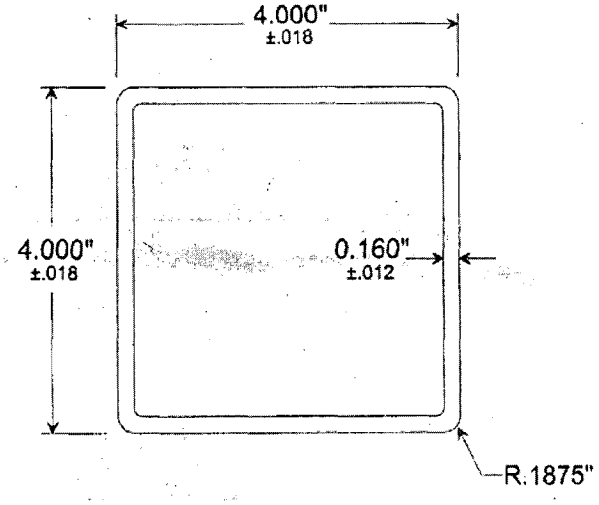


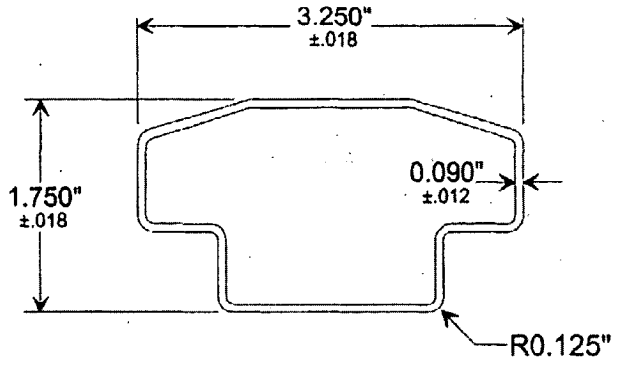
BALUSTER POST



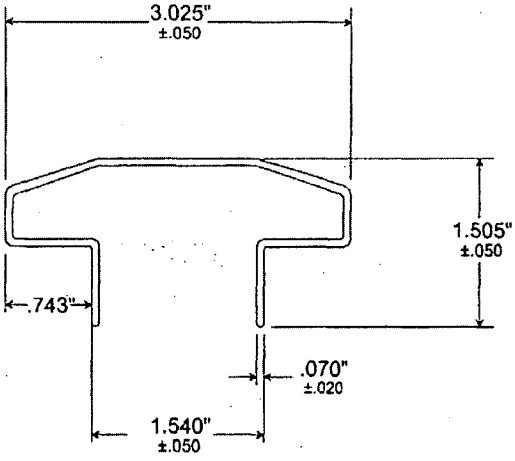
POST SLEEVE

For **SI:** 1 inch = 25.4 mm.

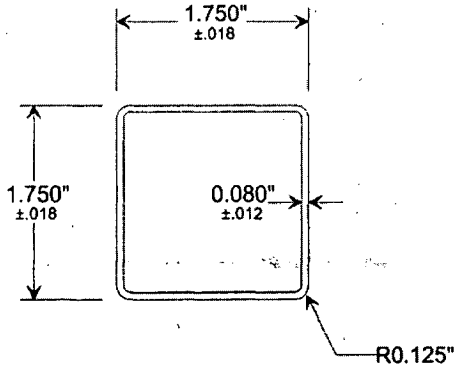
FIGURE 1—FALCON AND LXT GUARDRAIL SYSTEM COMPONENT PROFILES



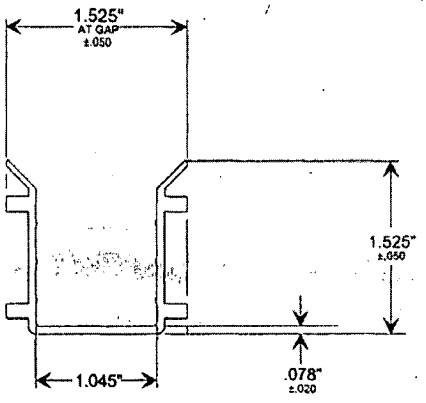
TOP RAIL



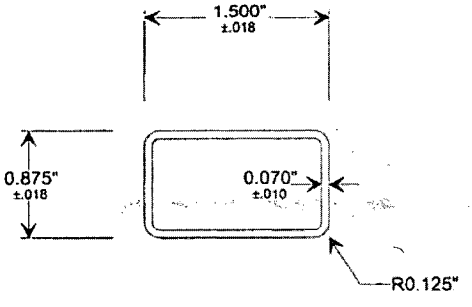
TOP RAIL INSERT



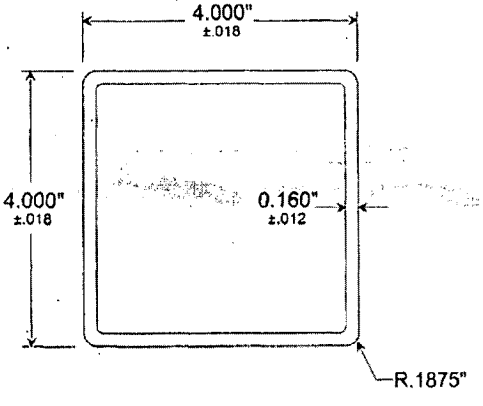
BOTTOM RAIL
(RAVEN SYSTEM ONLY)



BOTTOM RAIL INSERT
(RAVEN SYSTEM ONLY)



BALUSTER
(RAVEN SYSTEM ONLY)



POST SLEEVE

For **SI:** 1 inch = 25.4 mm.

FIGURE 2—RAVEN AND LXT GUARDRAIL SYSTEM COMPONENT PROFILES

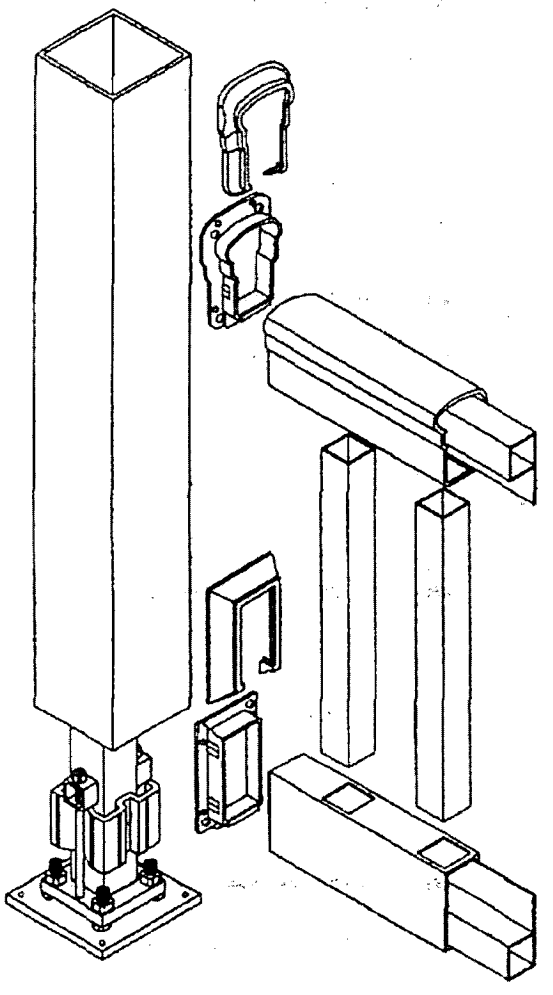


FIGURE 3—FALCON GUARDRAIL SYSTEM ASSEMBLY

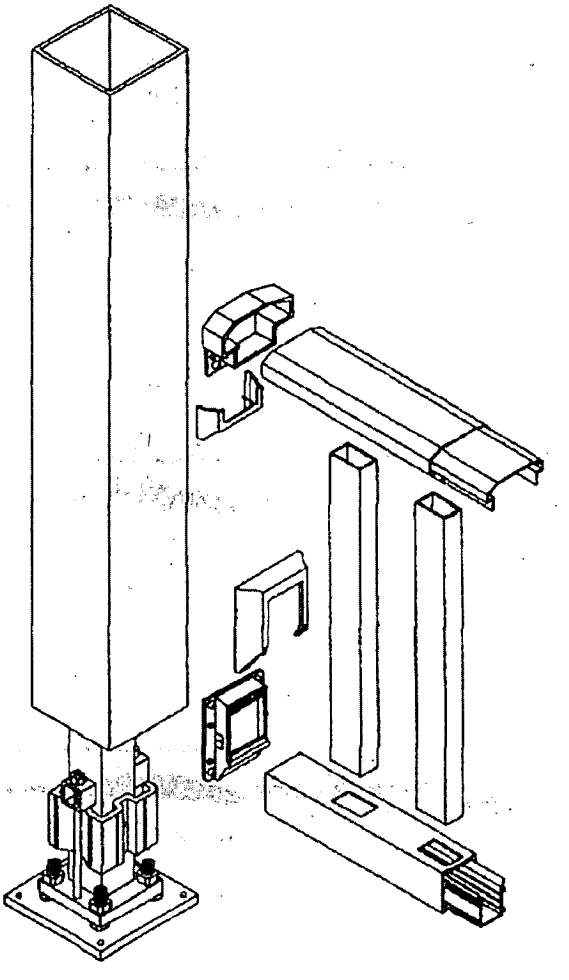


FIGURE 4—RAVEN GUARDRAIL SYSTEM ASSEMBLY

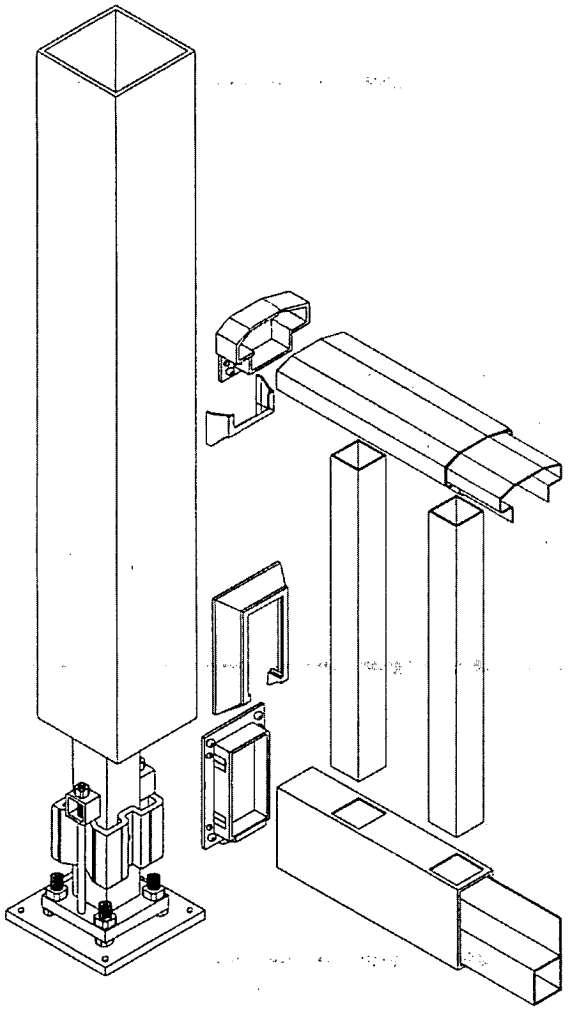


FIGURE 5—LXT GUARDRAIL SYSTEM ASSEMBLY

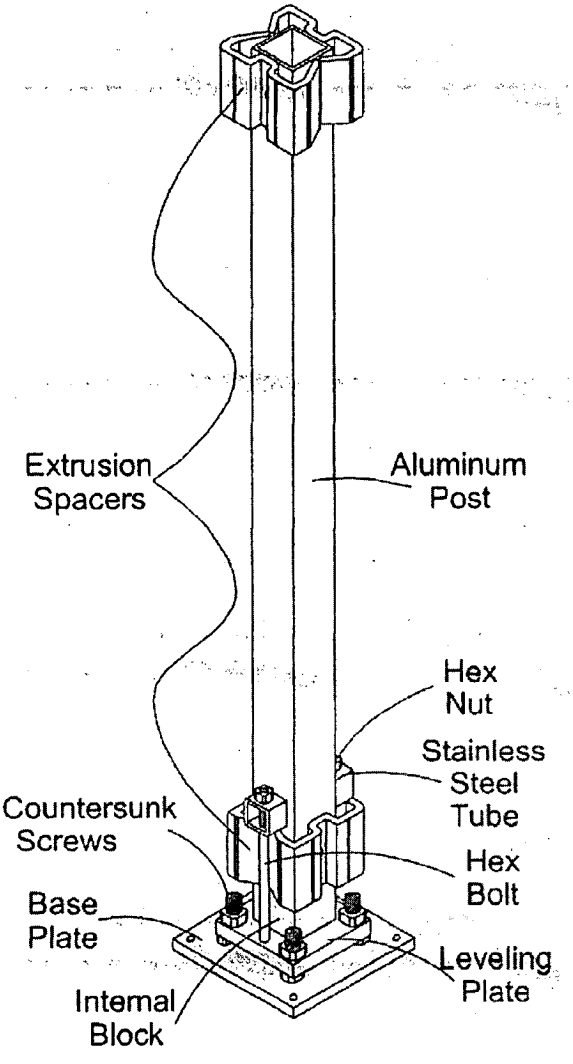


FIGURE 6—POST INSERT ASSEMBLY