



## Code Compliance Research Report

## CCRR-0112

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Page 1 of 21

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### 1.0 Subject

#### HDPE Guardrail Systems:

*fiberon® Professional Washington*  
*CertainTeed EverNew 20*  
*Home Depot Veranda*  
  
*2X4*  
  
*Portico™*

#### PVC Composite Guardrail Systems:

*fiberon® Horizon Deluxe*  
*fiberon® Horizon Flat*  
*fiberon® Horizon Mission*  
*fiberon® Horizon Provincial*  
*fiberon® Horizon Regency*  
*Home Depot Veranda White Rail*  
  
*fiberon® Horizon Plus*  
*CertainTeed Spectrum*  
*WeatherBest White Rail*  
  
*Severe Weather Plus Deluxe*  
*Severe Weather Plus Flat*  
  
*Lexington*  
  
*Charleston*  
  
*Springfield*

### 2.0 Research Scope

#### 2.1. Building Codes:

2006 International Building Code (IBC)  
2006 International Residential Code (IRC)

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

Products and Recognized Codes are summarized in Table 1 and Table 2.

#### 2.2. Properties:

Structural Performance  
Durability  
Surface Burning  
Decay Resistance  
Termite Resistance

### 3.0 Description

3.1. General – The Fiberon, LLC guardrail systems identified in Section 1.0 are guards 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, including stairs and ramps as described further herein, as required by the referenced codes.

3.2. Guard systems include top and bottom rails, vertical balusters, posts, rail-to-post brackets, post mounting brackets, crush blocks, decorative moldings, and post caps.

3.2.1. Level guards with heights of 36 inches and/or 42 inches above the floor surface are provided in lengths up to 8 feet (96 inches). See Table 1 and Table 2.

3.2.2. Stair guards are provided in lengths up to 8 feet (96 inches). See Table 1 and Table 2.

### 4.0 Materials and Processes

Two different material classifications and processes are utilized and identified as HDPE systems and PVC Composite systems.

4.1. HDPE (high density polyethylene) systems consist of rails, balusters, and post sleeves manufactured from an extruded wood-plastic composite material that is part polyethylene / polypropylene and part wood fiber.

4.1.1. HDPE Guardrail Systems include *fiberon® Professional Washington*, *CertainTeed EverNew 20*, *Home Depot Veranda*, *2X4*, and *Portico™*.

4.1.2. HDPE guardrail systems are produced in Gray, Redwood, Brown, Golden Cedar, Cedar, Tropics Jatoba, and Tropics Mahogany colors.

4.1.3. Rails and balusters are manufactured from extruded HDPE rectangular stock and then cut and milled to finished shapes. HDPE post sleeves and 2X4 rails in a Tropics color are extruded directly in the finished profile.

4.1.4. Balusters are also available in 0.75 inch round, powder coated, galvanized steel with a 0.05 inch thick wall.

4.2. PVC (Poly Vinyl Chloride) Composite systems consist of rails, balusters, and structural posts or post sleeves manufactured from an extruded wood-plastic composite material that is part PVC and part wood fiber with a PVC capstock applied by a co-extrusion process. Some balusters and post sleeves utilized in the PVC Composite systems are extruded PVC. PVC spindles are injection molded.

4.2.1. PVC Composite Guardrail Systems include the *fiberon*<sup>®</sup> *Horizon* series (*Deluxe, Flat, Mission, Provincial, Regency, Home Depot Veranda White Rail, Plus, CertainTeed Spectrum, and WeatherBest White Rail*), the *Severe Weather Plus* series (*Deluxe and Flat*), *Lexington, Charleston, and Springfield* systems.

4.2.2. PVC Composite guardrail systems are produced in White, Almond, Brick, Bronze, Slate, Sand, and Black colors.

## 5.0 Assembly

5.1. HDPE Guardrail Systems: *fiberon*<sup>®</sup> *Professional Washington, CertainTeed EverNew 20, Home Depot Veranda, 2X4, and Portico*<sup>™</sup>:

5.1.1. *fiberon*<sup>®</sup> *Professional Washington, CertainTeed EverNew 20, Home Depot Veranda, and Portico*<sup>™</sup> guard assemblies consist of a two-part top rail (upper sub-rail and top rail), a single bottom rail, and balusters that are mechanically fastened to the top and bottom rails. See Table 3 for baluster fastening details.

5.1.2. 2X4 guard assemblies consist of a two-part top rail (top rail and top rail cap), a single bottom rail, and balusters that are mechanically fastened to the top and bottom rails. See Table 3 for baluster fastening details.

5.1.3. Railing systems include a bottom rail intermediate support ("crush block") located beneath the bottom rail every 32 inches or less. Crush blocks are short pieces of HDPE baluster fastened to the bottom rail.

5.1.4. Non-structural 4 inch square HDPE post sleeves are available for installation over a conventional 4x4 wood post.

5.1.5. The *fiberon*<sup>®</sup> *Professional Washington, CertainTeed EverNew 20, Home Depot Veranda, and Portico*<sup>™</sup> level top rail assemblies and the level bottom rails are attached to sleeved 4x4 wood posts using an "L" shaped steel bracket at each of the four rail-to-post connection points. See Table 5 for bracket fastening and Figure 6 and Figure 7 for bracket details.

5.1.6. The *fiberon*<sup>®</sup> *Professional Washington, CertainTeed EverNew 20, Home Depot Veranda, and Portico*<sup>™</sup> stair top rail assemblies and the stair bottom rails are attached to sleeved 4x4 wood posts with a hinged bracket at each of the four rail-to-post connection points. See Table 5 for bracket fastening and Figure 6 and Figure 7 for bracket details.

5.1.7. 2X4 level top and bottom rails are attached to sleeved 4x4 wood posts with nylon brackets. See Table 5 for bracket fastening and Figure 6 for bracket details.

5.1.8. 2X4 stair top rail and the stair bottom rail are attached to sleeved 4x4 wood posts with a 1-1/4 inch square, solid extruded HDPE baluster cut to the height of the rail and attached to the post. The rails are then attached to the 1-1/4 inch square, solid extruded HDPE picket. See Table 5 for connection details.

5.1.9. HDPE guardrail systems have three baluster options:

1. 1-1/4 inch square extruded HDPE picket;
2. 1-1/2 inch square extruded HDPE picket;
3. 0.75 inch round, powder-coated, galvanized steel picket.

See Table 3 for additional baluster information and Figure 4 for details.

5.1.10. A non-structural decorative HDPE post cap and HDPE cove molding can be attached at the top of the HDPE-sleeved 4x4 wood post and around its base, respectively.

5.2. PVC Composite Guardrail Systems: the *fiberon*<sup>®</sup> *Horizon* series (*Deluxe, Flat, Mission, Provincial, Regency, Home Depot Veranda White Rail, Plus, CertainTeed Spectrum, and WeatherBest White Rail*), the *Severe Weather Plus* series (*Deluxe and Flat*), *Lexington, Charleston, and Springfield* systems.

5.2.1. The top rail in each of the PVC Composite systems consists of a single co-extruded PVC/wood composite with PVC capstock section. All top rails have pre-routed holes for installation of balusters or pre-cut slotted holes for installation of baluster dagger inserts. See Table 3 for additional details.

5.2.2. The bottom rail in each of the PVC Composite systems consists of a single co-extruded PVC/wood composite with PVC capstock section. Bottom rails have either pre-routed for baluster installation or pre-cut slotted holes for installation of baluster dagger inserts. See Table 3 for additional details.

5.2.3. PVC Composite guardrail systems have four baluster options:

1. 1-1/4 inch square co-extruded PVC/wood composite picket with PVC capstock;
2. 1-1/4 inch square extruded PVC picket;
3. 1-1/4 inch injection molded PVC Colonial spindles;
4. 0.75 inch round, powder-coated, galvanized steel picket.

See Table 3 for additional baluster information and Figure 4 for details.

5.2.4. Supports – PVC Composite guardrail systems can be attached to sleeved conventional 4x4 wood posts or to a structural PVC Composite post with railing system allowable heights in accordance with Table 4.

5.2.4.1. Non-structural PVC post sleeves or non-structural PVC Composite post sleeves can be utilized as a cladding over conventional 4x4 wood posts.

5.2.4.2. Structural PVC Composite posts are supported by a *fiberon*<sup>®</sup> Post Mount system for surface mount installations or can be installed in a wood deck with steel joist-mount brackets ("Standard Mount" or "Pro Mount").

5.2.4.3. "Standard Mount" brackets are manufactured from 14 gauge galvanized steel and are limited to use with 36 inch height railing systems.

5.2.4.4. "Pro Mount" brackets are manufactured from 11 gauge galvanized steel and may be used with railing system heights up to 42 inches.

5.2.5. Level railing systems include a bottom rail intermediate support ("crush block") located beneath the rail at mid-span. The crush block is a 3 inch long section of PVC Composite *Flat* rail, PVC Composite square picket, or PVC picket. The crush block is secured to the bottom rail with water-resistant PVC adhesive.

## 6.0 Performance Characteristics

6.1. 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.

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

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

6.4. The referenced criteria, AC174, requires a flame spread index (FSI) not exceeding 200 when testing in accordance with ASTM E 84. Materials utilized in guardrail systems described herein have a flame spread index as follows:

The HDPE material has an FSI of 115

The PVC/wood composite material with co-extruded PVC capstock has an FSI of 35.

The PVC material has an FSI of 45.

## 7.0 Installation

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

7.1. Assembly of railing systems (rails and balusters) shall be in accordance with Table 3.

7.2. Attachment of railing systems to supports shall be in accordance with Table 5 using connector brackets shown in Figure 6, Figure 7, Figure 8, and Figure 9.

7.3. Railing systems may be attached to conventional 4x4 wood posts or other suitable wood support structure. Wood in the supporting structure shall have a specific gravity of 0.50 or greater (Southern Yellow Pine or better) and a minimum thickness to allow full penetration of the bracket mounting screws. Conventional 4x4 wood posts or other wood supports are not within the scope of this report.

7.4. The *fiberon*<sup>®</sup> Post Mount may be mounted to a wood deck in accordance with the manufacturer's installation instructions and Figure 22.

7.5. The *fiberon*<sup>®</sup> Post Mount may be mounted to concrete and/or steel with approved anchors. Post mount anchors used in concrete or steel installation 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:

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

7.5.2. The anchors must be stainless steel, galvanized steel, or other approved material compatible with the steel post mount system.

7.5.3. The anchors must have a minimum diameter equal to 5/16 inch.

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

7.6. Steel joist-mount post brackets are bolted to structural wood members (joists or headers) with four 3/8 inch diameter bolts. The supporting structure (wood framing) is not within the scope of this report.

7.7. Post caps shall be installed over the exposed ends of structural PVC Composite posts and sleeved conventional 4x4 wood posts.

7.8. Crush blocks shall be installed between the deck surface and the guardrail.

## 8.0 Supporting Evidence

8.1. Drawings and installation instructions submitted by the manufacturer.

8.2. The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ICC-ES AC174, Acceptance Criteria for Deck Board Span Ratings and Guardrail Systems (Guards and Handrails), effective July 1, 2010.

8.3. 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).

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

## 9.0 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:

9.1. HDPE guards are limited to exterior use in all use groups of the IBC and IRC. See Table 1.

9.2. PVC Composite guards are limited to exterior use in the IRC (One- and Two-Family Dwellings) and residential use groups R3 and R4 of the IBC. See Table 2.

9.3. Conventional 4x4 wood posts and conventional wood supporting structure 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.

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

9.5. The use of the referenced guard systems in handrail applications is outside the scope of this report.



9.6. Only components and configurations identified in this report have been evaluated for performance and/or compliance to the referenced codes. Labeling of non-identified components or configurations with the CCRR program mark or number is prohibited.

9.7. Fiberon, LLC guardrail systems are manufactured in New London, North Carolina in accordance with the manufacturer's approved quality control system with inspections by PFS Corporation (IAS AA-652).

#### **10.0 Identification**

The guard systems produced by Fiberon, LLC identified in this report shall be identified with labeling on the individual components or the packaging and include the following:

10.1. Name and/or trademark of the manufacturer.

10.2. Identifying mark of the independent inspection agency, PFS Corporation (IAS AA-652)

10.3. The statement "ASTM D 7032 compliant. See CCRR-0112 at [www.ati-es.com](http://www.ati-es.com) for uses and performance levels".

When applicable, the phrase "For Use in One- and Two-Family Dwellings Only";

10.4. Architectural Testing Code Compliance Research Report number (CCRR-0112).

#### **11.0 Code Compliance Research Report Use**

11.1. 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.

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

11.3. Reference to the Architectural Testing internet web site address at [www.ati-es.com](http://www.ati-es.com) is recommended to ascertain the current version and status of this report.



**Table 1 – HDPE Railing Systems – Size and Code Recognition <sup>1</sup>**

HDPE Railing System	Code Recognition	
	IBC	IRC
<i>fiberon<sup>®</sup> Professional Washington            CertainTeed EverNew 20            Home Depot Veranda</i>	8' by 42" Level	8' by 42" Level 8 ft Stair
	N.A. with 0.75 inch round, powder coated, galvanized steel balusters	8' by 38" Level 88" by 30" Stair with 0.75 inch round, powder coated, galvanized steel balusters
2X4	8' by 42" Level	8' by 42" Level 8 ft Stair
<i>Portico<sup>™</sup></i>	N.A.	8' by 36" Level 8 ft Stair

<sup>1</sup> Railing lengths are the maximum clear length between supports. Railing height is the installed height from walking surface to top of top rail.



**Table 2 – PVC Composite Railing Systems – Size and Code Recognition <sup>1</sup>**

PVC Composite Railing System	Code Recognition	
	IBC <sup>2</sup>	IRC
<i>fiberon<sup>®</sup> Horizon</i> <i>Mission, Provincial, Regency, and Plus</i> <i>Home Depot Veranda White Rail</i> <i>CertainTeed Spectrum</i> <i>WeatherBest White Rail</i>	8' by 42" Level 8 ft Stair	8' by 36" Level 8 ft Stair
	N.A.  with 0.75 inch round, powder coated, galvanized steel balusters	8' by 38" Level 70" by 32" Stair  with 0.75 inch round, powder coated, galvanized steel balusters
<i>fiberon<sup>®</sup> Horizon Deluxe</i> <i>Lexington</i> <i>Charleston</i>	6' by 42" Level 6 ft Stair	6' by 36" Level 6 ft Stair
<i>fiberon<sup>®</sup> Horizon Flat <sup>3</sup></i> <i>Springfield <sup>3</sup></i>	8' by 42" Level	8' by 36" Level

<sup>1</sup> Railing lengths are the maximum clear length between supports. Railing height is the installed height from walking surface to top of top rail.

<sup>2</sup> Code recognition for the IBC is limited to Residential use groups R-3 and R-4

<sup>3</sup> The *Flat* and *Springfield* rail styles are not provided in a stair rail configuration.

**Table 3 – Railing System Descriptions**

Railing System	Rail/Baluster Assembly	Balusters
<i>fiberon® Professional Washington</i> <i>CertainTeed EverNew 20</i>	Top sub-rail and bottom rail are attached to balusters with a single #10 by 1-3/4 inch pan-head wood screw in each end. Screws are inserted through pre-drilled holes in the upper and lower rails and into each end of the baluster.	1-1/4 inch square HDPE picket with beveled corners  0.75 inch round, powder coated, galvanized steel with a 0.05 inch thick wall
<i>Portico™</i>	Double top rail members are fastened together with #10 by 1-3/8 inch screws spaced approximately 12 inches apart.  Bottom rail is attached to intermediate support blocks with a single #10 by 1-3/4 inch screw.	1-1/4 inch square HDPE picket with beveled corners
<i>Home Depot Veranda</i>	Top rail and bottom rail are attached to 0.75 inch round, powder coated, galvanized steel balusters using two EZ-Mount fasteners (top and bottom) with one #10 by 2 inch flat-head screw each.	1-1/2 inch square HDPE picket with beveled corners  0.75 inch round, powder coated, galvanized steel with a 0.05 inch thick wall
2X4	Top rail and bottom rail are attached to balusters using two EZ-Mount fasteners (top and bottom) with one #10 by 2 inch flat-head screw each.  Top rail cap is fastened to the top rail with #10 by 2-1/2 inch deck screws spaced approximately 8 inches apart.  Bottom rail is attached to intermediate support blocks with a single #10 by 2-1/2 inch deck screw.	0.75 inch round, powder coated, galvanized steel with a 0.05 inch thick wall
<i>fiberon® Horizon</i> <i>Mission</i> <i>Provincial</i> <i>Regency</i> <i>Deluxe</i> <i>Flat</i> <i>Plus</i> <i>Home Depot Veranda</i> <i>White Rail</i> <i>Lexington</i> <i>Charleston</i> <i>Springfield</i> <i>CertainTeed Spectrum</i> <i>WeatherBest White Rail</i>	Balusters are inserted into top and/or bottom rails via pre-routed holes in the rail members.  -and/or-  Balusters are attached to the top and/or bottom rails via molded plastic dagger inserts. Dagger inserts are fitted into the baluster and then placed into pre-cut slotted holes in the rail.  -or-  Top rail and bottom rail are attached to 0.75 inch round, powder coated, galvanized steel balusters using two EZ-Mount fasteners (top and bottom) with one #10 by 2 inch flat-head screw each.	1-1/4 inch square PVC/wood composite picket  1-1/4 inch square extruded PVC picket  1-1/4 inch square-ended injection molded PVC colonial spindle <sup>1</sup>  0.75 inch round, powder coated, galvanized steel with a 0.05 inch thick wall <sup>1</sup>

<sup>1</sup> Limited to use in IRC and in residential use groups R3 and R4 of the IBC.

**Table 4 – Post Mounting Information**

<b>Guard System</b>	<b>Post Mount System</b>	<b>Post / Post Sleeve</b>	<b>Max. Rail Height</b>
<i>fiberon® Professional Washington</i> <i>CertainTeed EverNew 20</i> <i>Home Depot Veranda 2X4</i>	Conventional 4x4 wood posts (Southern Pine or equivalent)	4 inch square HDPE post sleeve	42"
<i>Portico™</i>	Conventional 4x4 wood posts (Southern Pine or equivalent)	4 inch square HDPE post sleeve	36"
<i>fiberon® Horizon and Severe Weather</i> <i>Mission Provincial Regency Deluxe Flat Plus</i> <i>Lexington Charleston Springfield</i> <i>Home Depot Veranda White Rail</i> <i>CertainTeed Spectrum</i> <i>WeatherBest White Rail</i>	Conventional 4x4 wood posts (Southern Pine or equivalent)	PVC Post Sleeve -or- PVC/Wood Composite Post Sleeve	36"
	<i>fiberon®</i> Post Mount mounted to Surface of wood deck -or- Concrete surface (See Figure 22)	Structural PVC/Wood Composite Post	42"
	"Standard Mount" – Joist mount post bracket	Structural PVC/Wood Composite Post	36"
	"Pro Mount" – Joist mount post bracket	Structural PVC/Wood Composite Post	42"

**Table 5 – Rail Bracket Fastening Schedule <sup>1</sup>**

Rail – Bracket Combination		Bracket to Post	Bracket to Rail
fiberon® Professional Washington CertainTeed EverNew 20 Home Depot Veranda Portico™	Level	<u>Top and Bottom Rail (Standard Bracket):</u> (4) #10 by 2 inch long screws	<u>Top Rail (Standard Bracket):</u> (4) #10 by 1-3/8 inch long screws  <u>Bottom Rail (Standard Bracket):</u> (4) #10 by 3/4 inch long screws
		<u>Top and Bottom Rail (Alternate Bracket):</u> (2) #10 by 2 inch long screws	<u>Top Rail (Alternate Bracket):</u> (3) #10 by 1-3/8 inch long screws  <u>Bottom Rail (Alternate Bracket):</u> (3) #10 by 3/4 inch long screws
	Stair	<u>Top and Bottom Rail (Standard Bracket):</u> (4) #10 by 2 inch long screws	<u>Top Rail (Standard Bracket):</u> (4) #10 by 1-3/8 inch long screws  <u>Bottom Rail (Standard Bracket):</u> (4) #10 by 3/4 inch long screws
		<u>Top and Bottom Rail (Alternate Bracket):</u> (2) #12 by 2 inch long screws	<u>Top Rail (Alternate Bracket):</u> (3) #12 by 1 inch long screws  <u>Bottom Rail (Alternate Bracket):</u> (3) #12 by 1 inch long screws
2X4	Level	<u>Top and Bottom Rail:</u> (3) #8 by 3 inch pan-head T-20 wood screws	<u>Top Rail:</u> Screws attaching Bracket to Post also "toe-nail" through the rail during installation
	Stair	<u>Top and Bottom Rail:</u> A 1-1/4 inch square baluster is attached to the post using (6) #10 by 2-1/2 inch deck screws	<u>Top and Bottom Rail:</u> (2) #10 by 2-1/2 inch deck screws
fiberon® Horizon Mission Provincial Regency Plus Home Depot Veranda White Rail CertainTeed Spectrum WeatherBest White Rail	Level	<u>Structural PVC/Wood Composite Posts:</u> Top Rail: (2) #12 by 3/4 inch long screws Bottom Rail: (2) #10 by 3/4 inch long screws	<u>Top Rail:</u> (3) #12 by 3/4 inch long screws  <u>Bottom Rail:</u> (3) #10 by 3/4 inch screws
		<u>Conventional 4x4 Wood Post (sleeved):</u> Top Rail: (2) #12 by 2 inch long screws Bottom Rail: (2) #10 by 2 inch long screws	
	Stair	<u>Structural PVC/Wood Composite Posts:</u> Top and Bottom Rail: (2) #12 by 3/4 inch long screws	<u>Top and Bottom Rail:</u> (3) #12 by 3/4 inch long screws
		<u>Conventional 4x4 Wood Post (sleeved):</u> Top and Bottom Rail: (2) #12 by 2 inch long screws	

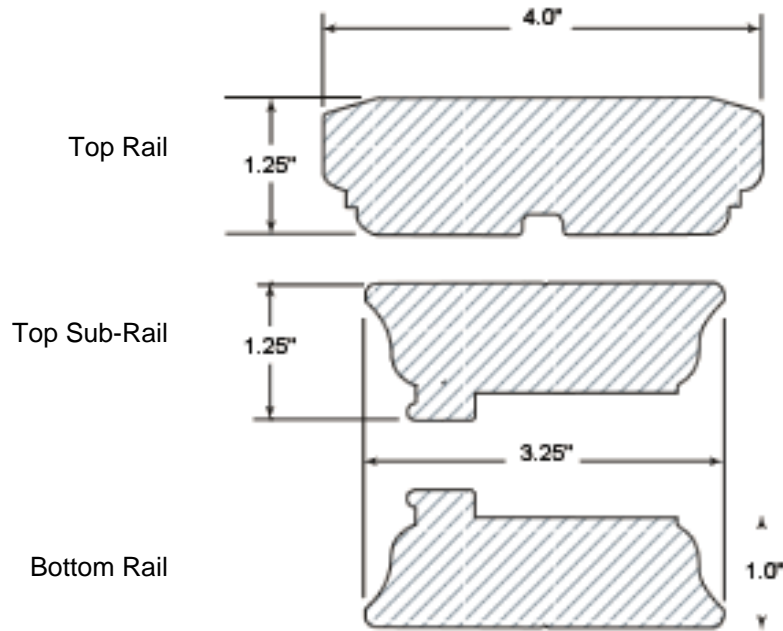


**Table 5 – Rail Bracket Fastening Schedule <sup>1</sup>**  
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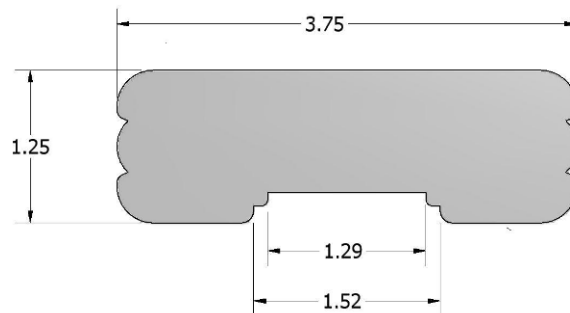
Rail – Bracket Combination		Bracket to Post	Bracket to Rail
<i>fiberon<sup>®</sup> Horizon</i> <i>Deluxe</i> <i>Flat</i>  <i>Lexington</i> <i>Charleston</i> <i>Springfield</i>	Level	<u>Structural PVC/Wood Composite Posts:</u> Top Rail: (2) #12 by 3/4 inch long screws Bottom Rail: (2) #10 by 3/4 inch long screws	<u>Top Rail:</u> (2) #12 by 1-1/4 inch long screws  <u>Bottom Rail:</u> N/A
		<u>Conventional 4x4 Wood Post (sleeved):</u> Top Rail: (2) #12 by 2 inch long screws Bottom Rail: (2) #10 by 2 inch long screws	N/A
<i>fiberon<sup>®</sup> Horizon</i> <i>Deluxe</i>  <i>Lexington</i> <i>Charleston</i>	Stair <sup>2</sup>	<u>Structural PVC/Composite Wood Posts:</u> Top and Bottom Rail: (2) #12 by 3 inch long screws <sup>2</sup>	N/A
		<u>Conventional 4x4 Wood Post (sleeved):</u> Top and Bottom Rail: (2) #12 by 3 inch long screws <sup>2</sup>	N/A

<sup>1</sup> All fasteners and metal brackets are stainless steel.

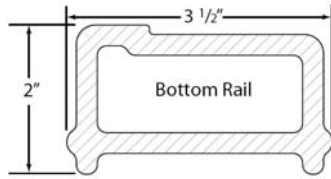
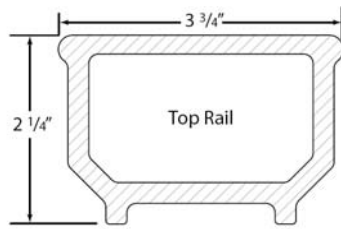
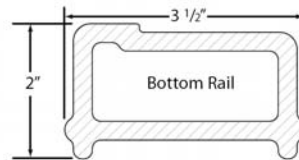
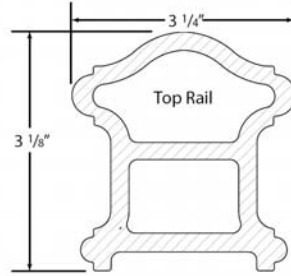
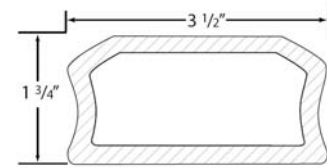
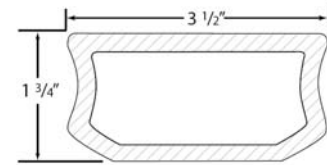
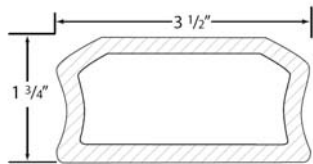
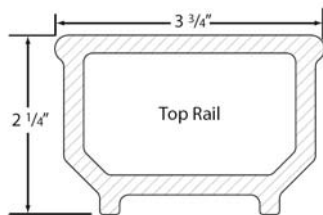
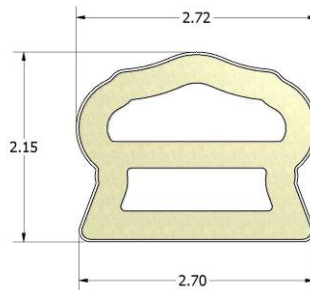
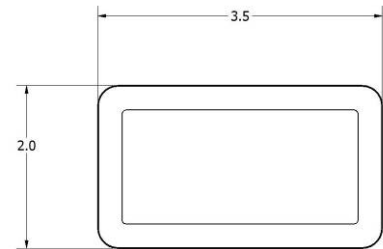
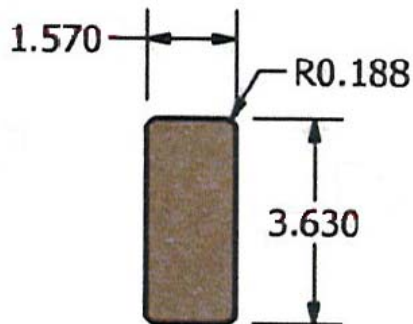
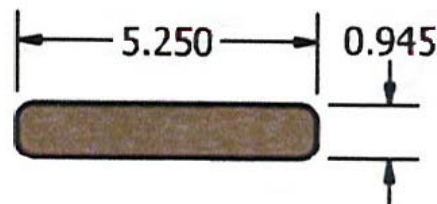
<sup>2</sup> *Deluxe*, *Lexington*, and *Charleston* stair rail brackets must be field cut according to the slope of the stair for a flush fit to the supporting surface and must provide at least 1 inch of fastener penetration into wood supports or full thickness penetration in Structural PVC/Wood Composite Posts.

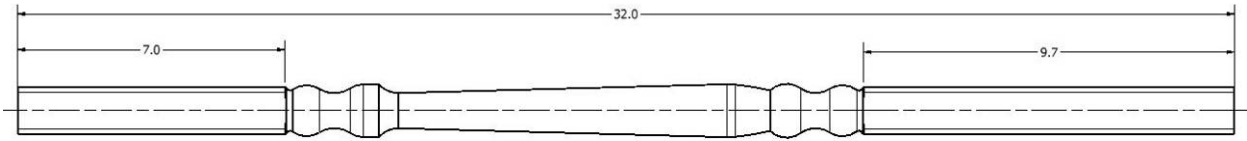


**Figure 1 – Rail Profiles**  
*fiberon® Professional Washington, CertainTeed EverNew 20, and Home Depot Veranda*



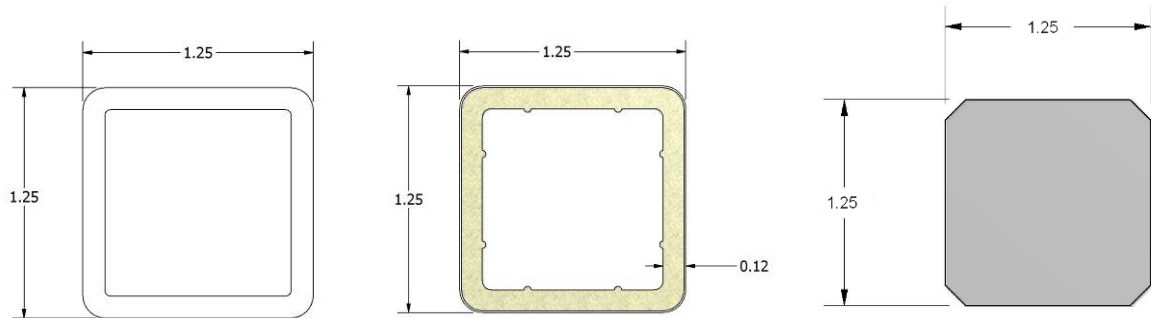
**Figure 2 – Rail (Top, Sub, and Bottom) Profiles**  
*Portico™*


**Mission**

**Provincial**

**Regency and Home Depot Veranda White Rail**  
 (Top Rail: 0.30 inch Wall)  
 (Bottom Rail: 0.20 inch Wall)

**Horizon Plus**  
**CertainTeed Spectrum™**  
**WeatherBest White Rail**

**Deluxe, Lexington, and Charleston**  
 (Top Rail)

**Flat and Springfield**  
 (Top and Bottom Rail)

**2x4 Top and Bottom Rail**

**2x4 Top Rail Cap**
**Figure 3 – Rail Profiles**



PVC Colonial Spindle

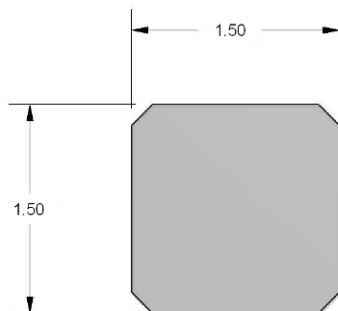
32 inch Length Shown (*Mission, Provincial, Deluxe, and Flat*)  
34 inch Length (*Regency and Home Depot Veranda White Rail*)



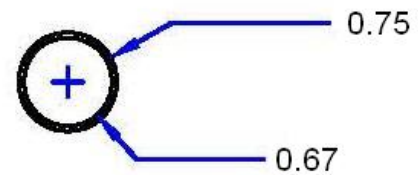
1-1/4 inch Square Extruded PVC Picket (0.08 inch Wall)

1-1/4 inch Square PVC/Wood Composite Baluster (0.125 inch Wall)

1-1/4 inch Square Solid HDPE Baluster

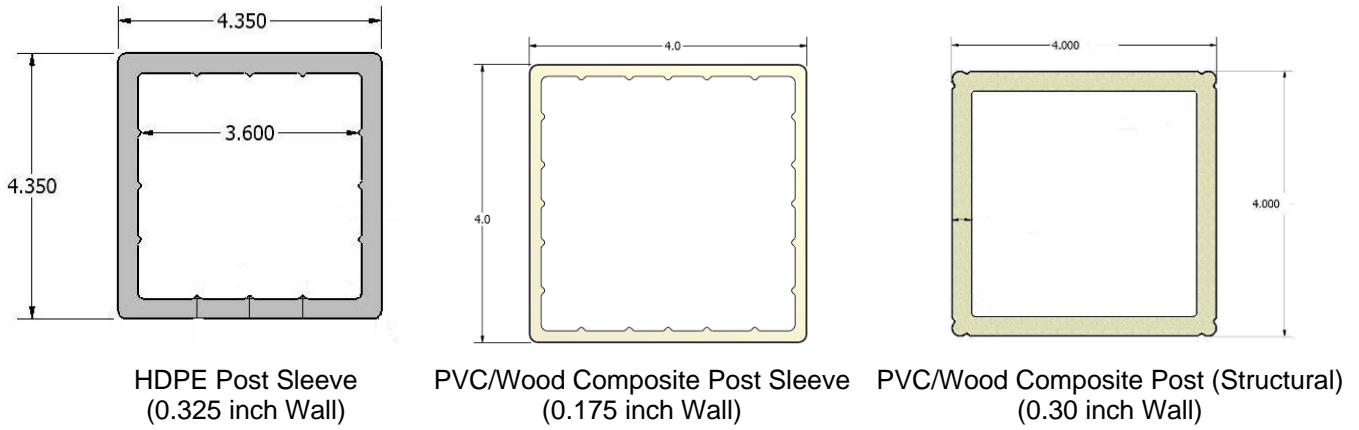


1-1/2 inch Square Solid HDPE Baluster

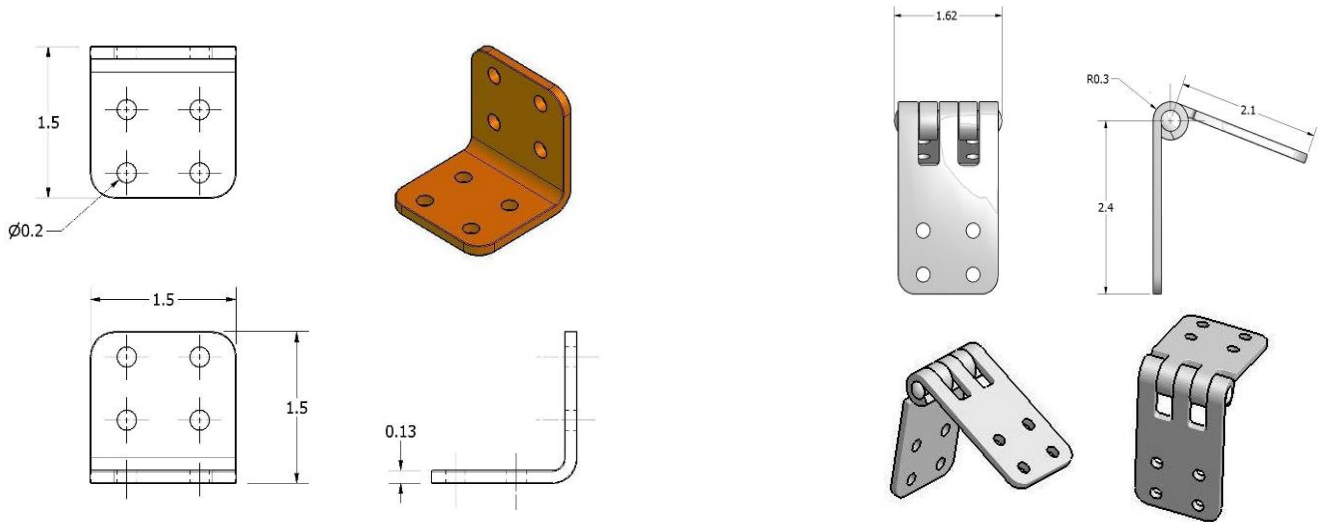


0.75 inch Round Steel Baluster

**Figure 4 – Baluster Profiles**

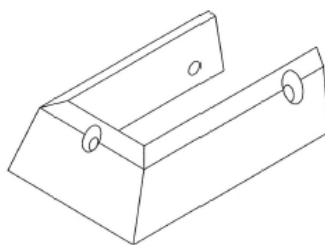


**Figure 5 – Composite Posts and Post Sleeves**



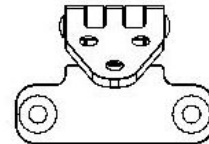
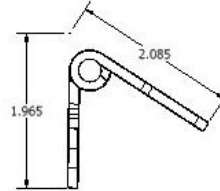
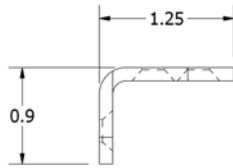
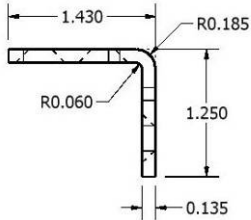
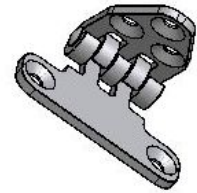
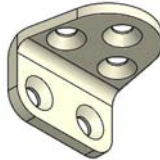
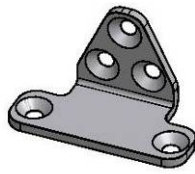
**Standard HDPE Level Bracket**

**Standard HDPE Stair Bracket**



**2X4 Level Bracket**

**Figure 6 – Attachment Brackets for HDPE Systems**

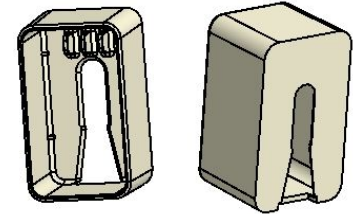
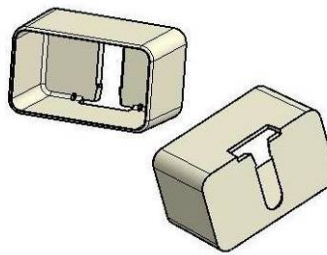
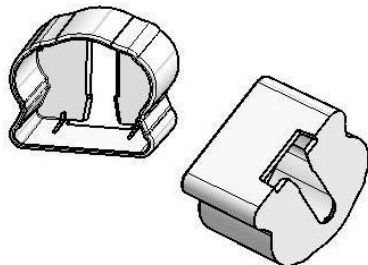


Level Bracket / Top

Level Bracket / Bottom

Hinged Bracket - Stair

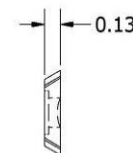
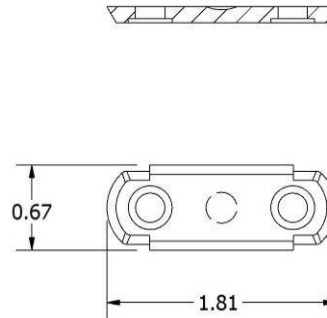
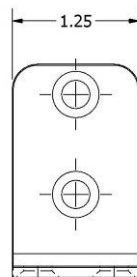
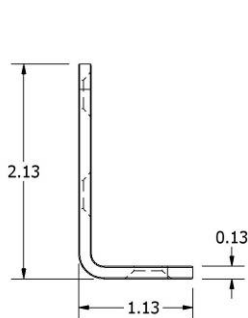
**Figure 7 – Attachment Brackets for:**  
**PVC Composite Systems: Mission, Provincial, and Regency**  
**HDPE Systems: fiberon® Professional Washington, CertainTeed EverNew 20, Home Depot Veranda, and Portico™**



*Deluxe, Lexington, and Charleston*  
Top Rail PVC Bracket

*Flat and Springfield Rail*  
PVC Bracket

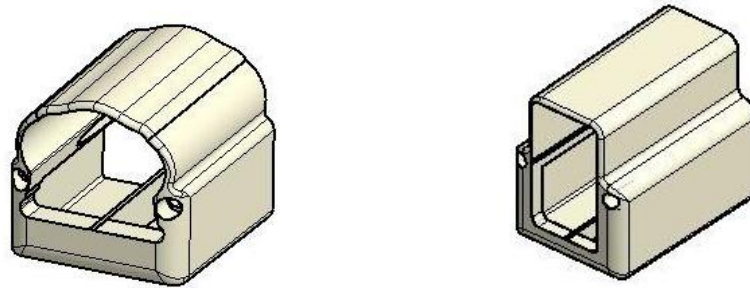
*Bottom Rail - Edge*  
PVC Bracket



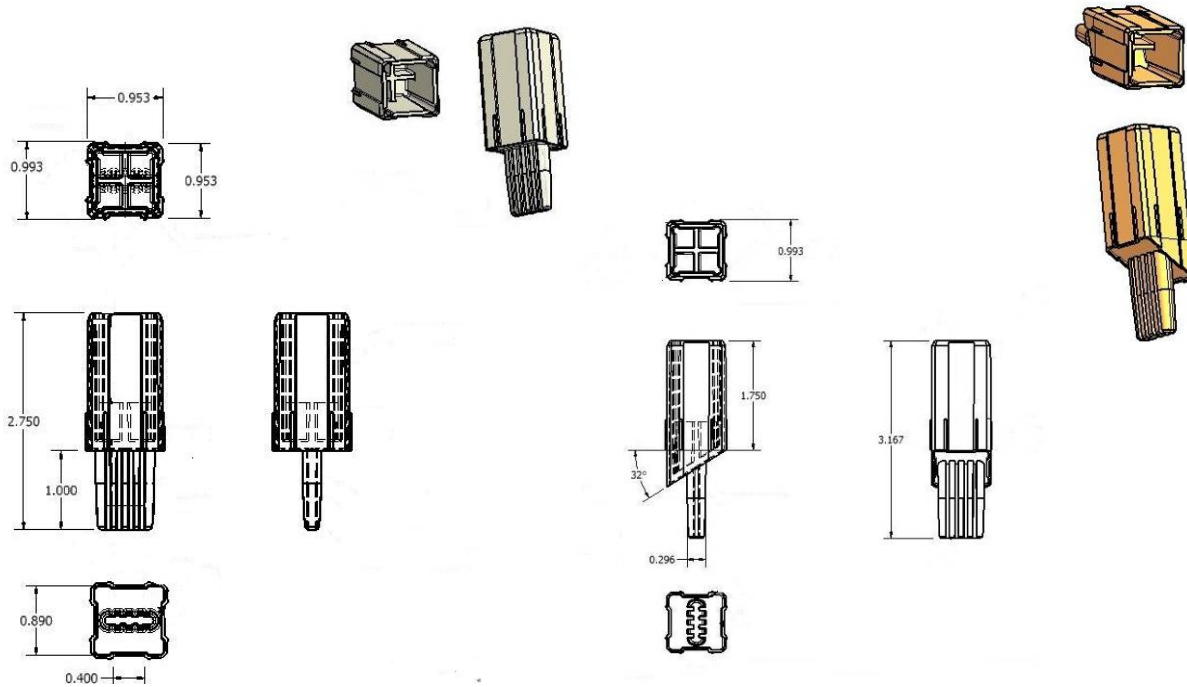
Top Rail Stainless Steel L-Clip  
(*Deluxe* and *Flat* Top Rail Brackets)

PVC Dovetail Clip  
(*Deluxe, Flat, and Edge* Brackets)

**Figure 8 – Attachment Brackets for PVC Systems**  
*Deluxe, Lexington, Charleston, Springfield, and Flat* Level Rails

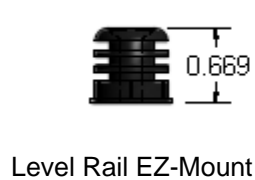


**Figure 9 – Attachment Brackets for PVC Systems**  
*Deluxe, Lexington, and Charleston Stair Rails*

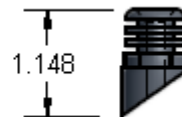


Level Rail Dagger

Stair Rail Dagger (Angled)

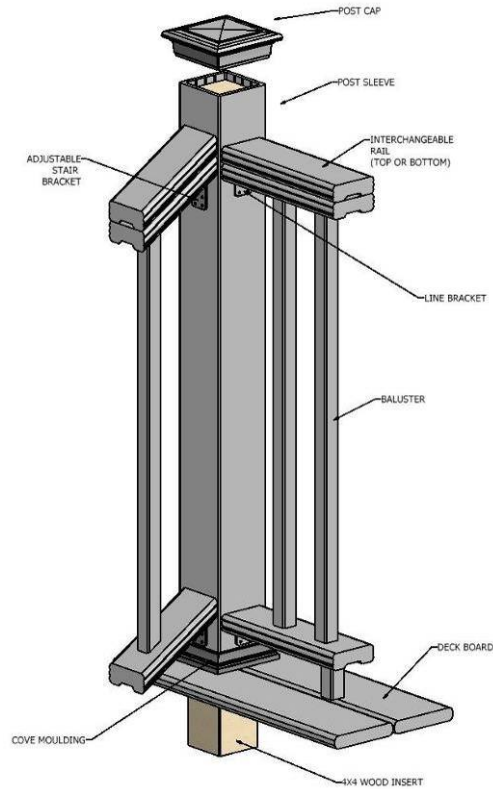


Level Rail EZ-Mount

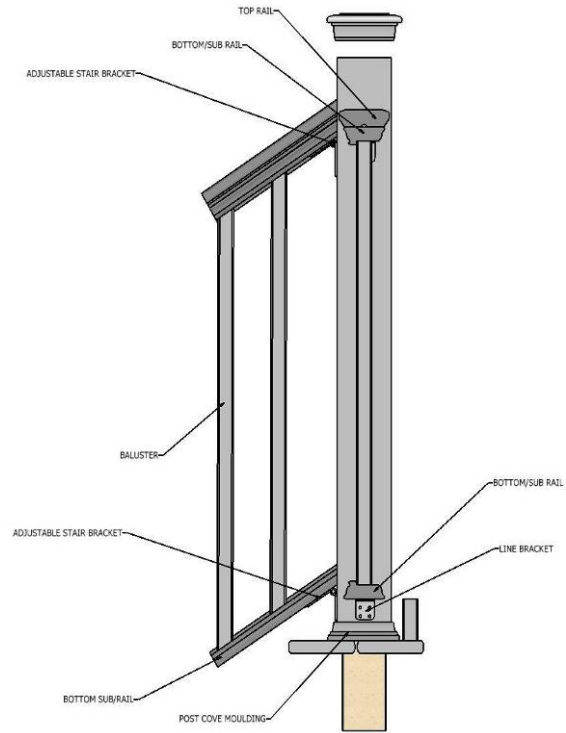


Stair Rail EZ-Mount

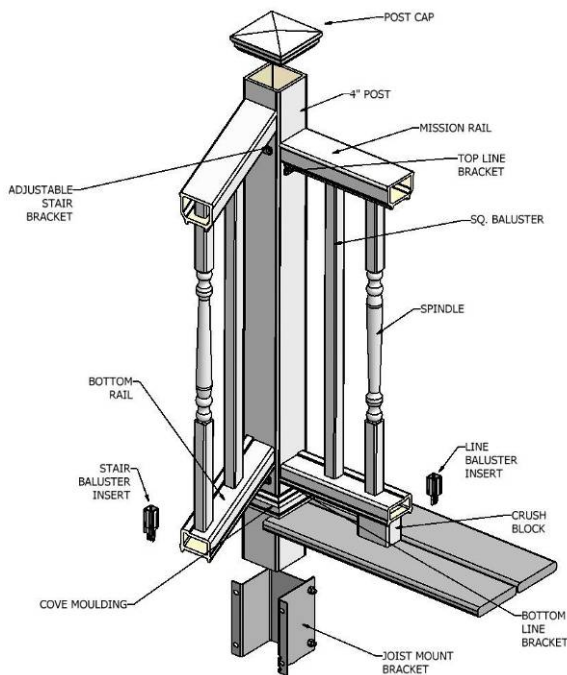
**Figure 10 – Baluster Dagger Inserts**  
*Mission and Provincial Baluster Attachment to Bottom Rail*



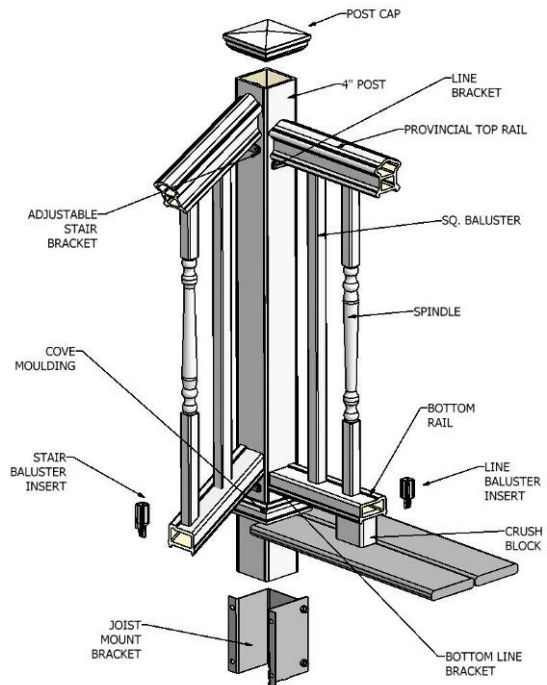
**Figure 11 – Portico™**



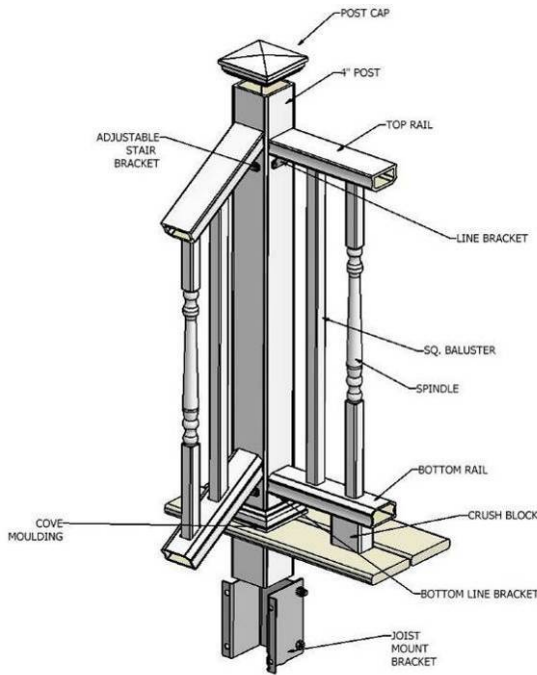
**Figure 12 – Professional Washington, Home Depot Veranda, and CertainTeed EverNew 20**



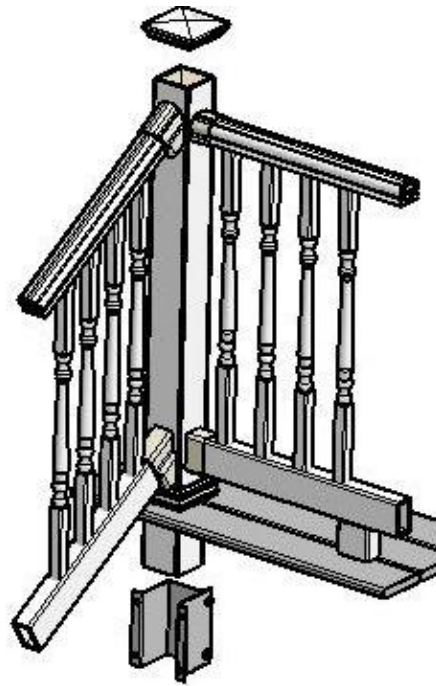
**Figure 13 – fiberon® Mission**



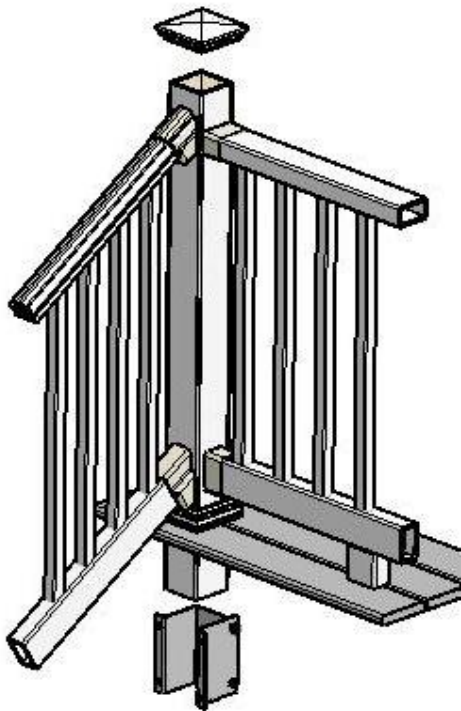
**Figure 14 – fiberon® Provincial**



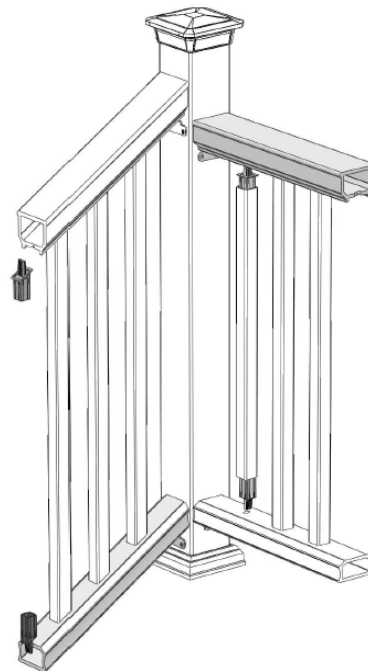
**Figure 15 – *fiberon*® Regency and Home Depot Veranda White Rail**



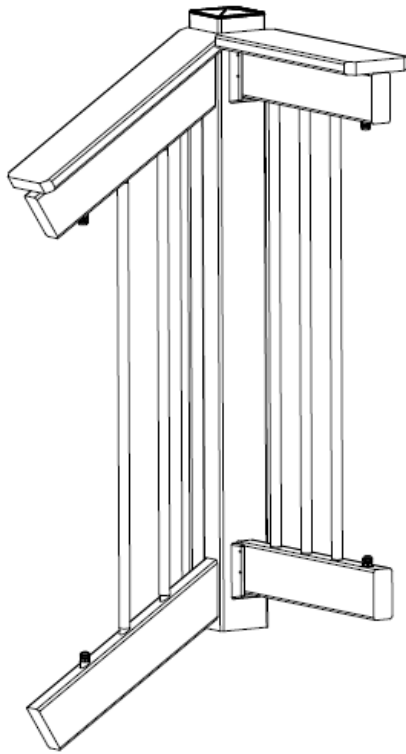
**Figure 16 – *Deluxe, Lexington, and Charleston***



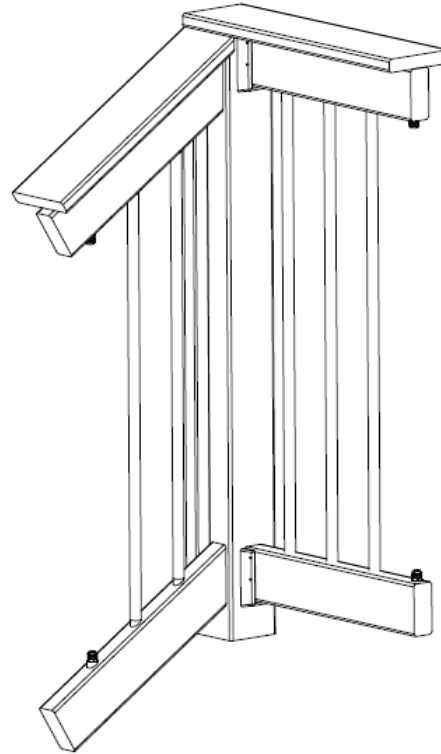
**Figure 17 – *Flat and Springfield***



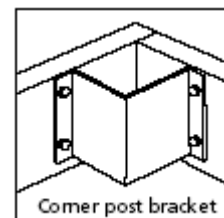
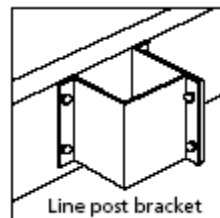
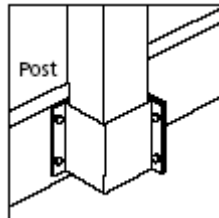
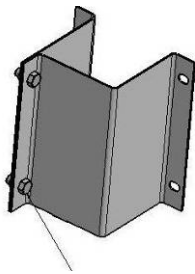
**Figure 18 – *fiberon*® Horizon Plus, CertainTeed Spectrum, and WeatherBest White Rail**



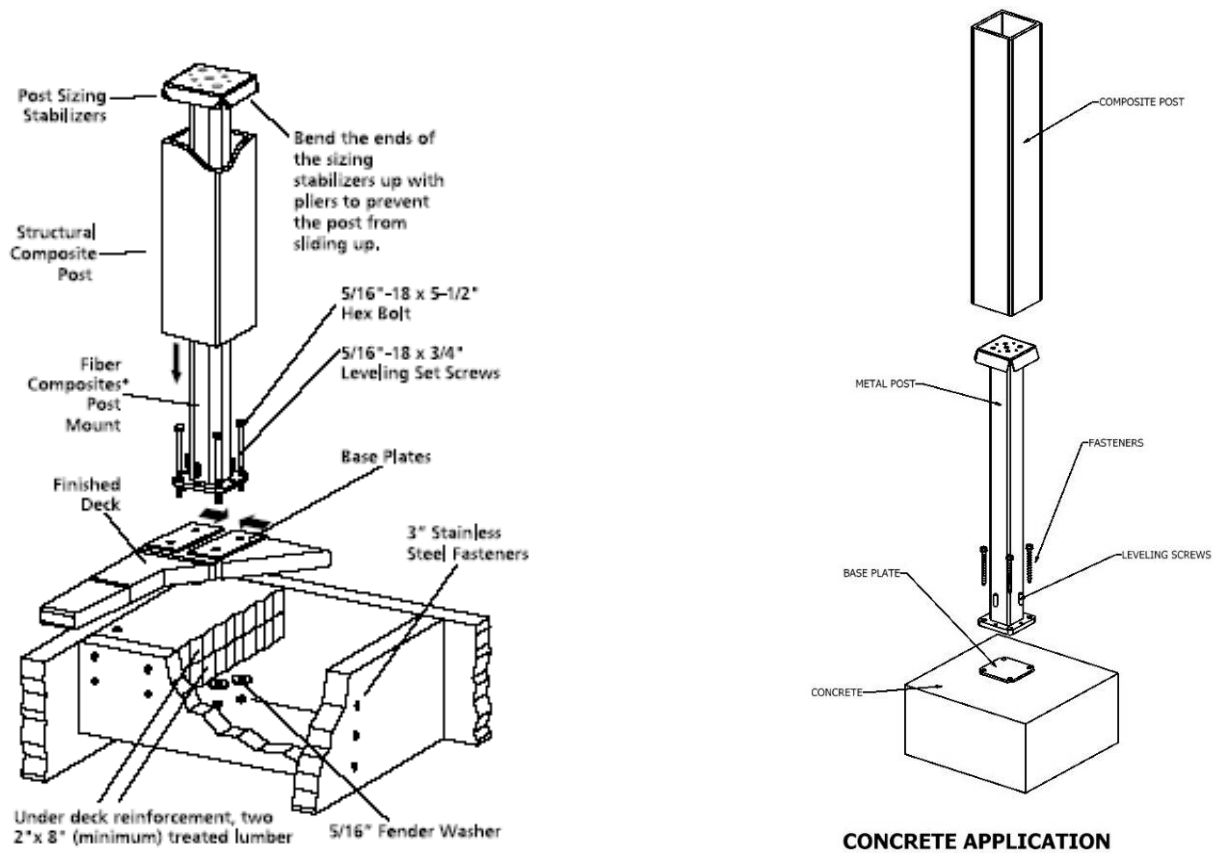
**Figure 19 – 2X4**



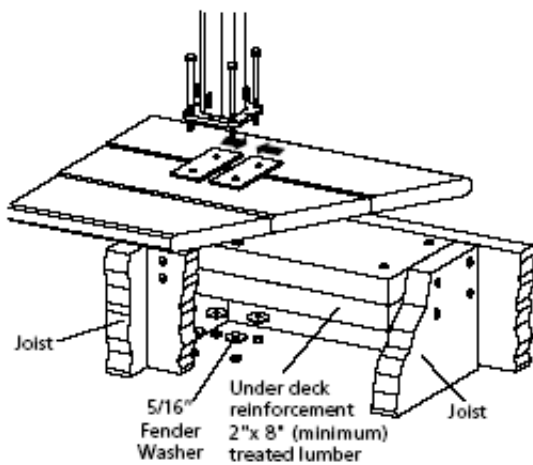
**Figure 20 – 2X4 in Board-over-Post Installation**



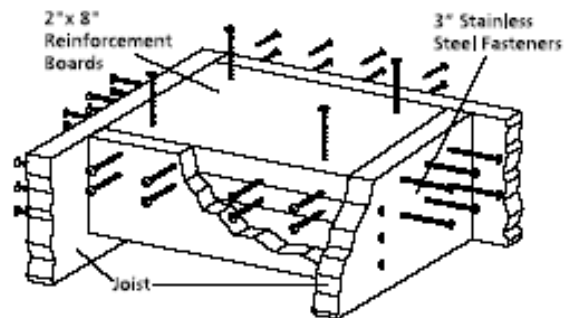
**Figure 21 – Joist-Mount Brackets**  
Standard Mount (14 gage steel)  
Pro Mount (11 gage steel)



Wood Deck Corner Installation



Wood Deck Line Installation



Wood Deck Support Blocking

Figure 22 – fiberon® Post Mount