

Issue Date: 08-31-2007

Revision Date: 06-03-2023

Renewal Date: 06-30-2024

DIVISION: 06 00 00 – WOOD, PLASTICS AND COMPOSITES

Section: 06 63 00 - Plastic Railings

## REPORT HOLDER:

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## REPORT SUBJECT:

Guard Systems

*TimberTech® Classic Composite Series**RadianceRail®**Premier**Trademark**Drink Rail**Contemporary Rail**TimberTech® RadianceRail Express®**TimberTech® Reserve Rail™*

## 1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

- 2021, 2018, 2015 *International Building Code®* (IBC)
- 2021, 2018, 2015 *International Residential Code®* (IRC)

NOTE: This report references the most recent Code editions cited. Sections numbers in earlier editions may differ.

1.2 General – The *TimberTech®* guards have been evaluated for the following properties:

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

General – The *TimberTech®* guards have been evaluated for the following uses:

- Guards are intended for exterior use at or near the open sides of elevated walking areas of buildings and walkways as required by the referenced codes.
- Guard systems recognized in this report may be used in One- and Two-Family Dwellings regulated by the IRC and all construction types regulated by the IBC in accordance with IBC Section 705.2.2 and 705.2.3.1, Exceptions 2 and 3. Guards less than 42 inches high are limited to use in One- and Two-Family Dwellings (IRC). See Table 1 for additional restrictions based upon Use and Occupancy Classification.

## 2.0 STATEMENT OF COMPLIANCE

General – The *TimberTech®* guards comply with the Codes listed in Section 1.1, for the properties stated in Section 1.2 and uses stated in Section 1.3, when installed as described in this report, including the Conditions of Use stated in Section 6.0.

## 3.0 DESCRIPTION

3.1 **General** – *TimberTech®* guards are offered in the following assemblies. The Classic Composite Series (*RadianceRail®*, *Premier*, *Trademark*, *Drink Rail* and *Contemporary Rail*), *TimberTech® RadianceRail Express®* and *TimberTech® Reserve Rail™*. All are guards under the definitions of the referenced codes. See Table 1 for qualified lengths and configurations.

3.2 The Composite Series *RadianceRail®*, *Premier*, *Trademark*, and *Reserve* composite guard system include a top and bottom rail, two support rails, infill, post sleeves, rail-to-post brackets, support blocks, foot blocks, and decorative moldings. *Drink Rail* uses an assembly of a deck plank with a second bottom rail and support rail as a top rail assembly. *Contemporary Rail* uses an assembly of a 6.35-inch by 0.875-inch plank with a second bottom rail and support rail as a top rail assembly



**3.2.1** Support rails are a composite extrusion for rail lengths up to 92 inches. For lengths exceeding 92 inches, the topsupport rail is an aluminum extrusion with a composite bottom support rail.

**3.2.2** Rails (top, bottom, and support) and post sleeves are manufactured from extruded shapes in six colors: Coastal White (White), Mountain Cedar, Classic Black (Black), SandRidge (Brownstone), RiverRock (Slate Grey), and Traditional Walnut (Kona). All components are co- extruded with a polymer color cap layer and wood/plastic composite core. See Table 2 for rail descriptions and Table3 for infill options.

**3.3** The *RadianceRail® Express* guard system includes top and bottom rails, vertical balusters, post sleeves, rail-to-post brackets, foot blocks and decorative moldings. All components are produced in Classic Black (Black), Coastal White (White), and Traditional Walnut (Kona). See Table 2 for rail descriptions and Table 3 for infill options.

**3.4** The Classic Composite Series Drink Rail guard system includes one deck board top rail, two universal rails, two support rails, infill, post sleeves, rail-to-post brackets, support blocks, foot blocks, and decorative moldings.

**3.4.1** Rails (universal, and support) and post sleeves are manufactured from extruded shapes in six colors: Coastal White (White), Mountain Cedar, Classic Black (Black), SandRidge (Brownstone), RiverRock (Slate Grey), and Traditional Walnut (Kona). All components are co- extruded with a polymer color cap layer and wood/plastic composite core. See Table 2 for rail descriptions and Table3 for infill options.

**3.5** The Classic Composite Series Contemporary Rail guard system includes one 6.35-inch by 0.875-inch top rail, two universal rails, two support rails, infill, post sleeves, rail-to-post brackets, support blocks, foot blocks, and decorative moldings.

**3.5.1** Rails (universal, and support) and post sleeves are manufactured from extruded shapes in two colors: Classic Black and Traditional Walnut. All components are co- extruded with a polymer color cap layer and wood/plastic composite core. See Table 2 for rail descriptions and Table 3 for infill options.

## 4.0 PERFORMANCE CHARACTERISTICS

**4.1** The *TimberTech®* 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 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** The composite core material with polymer capstock and the components with polymer material have flame spread not exceeding 200 when tested in accordance with ASTM E 84.

## 5.0 INSTALLATION

**5.1 General:** The *TimberTech®* guards must be installed in accordance with the manufacturer's published installation instructions, the applicable Code, and this Research Report. A copy of the manufacturer's instructions must be available on the jobsiteduring installation.

### 5.2 Application:

**5.2.1** Foot blocks are a section of nominal 1.2 Inch square extruded composite picket with an expanded PVC core to facilitate fastening. Foot blocks shall be installed at approximate 1/3 intervals for rails over six feet in length or at mid-span for rails less than six feet in length of the bottom guard between the deck surface and the guard. See Table 3.

**5.2.2** Guard systems may be attached to conventional 4x4 and 6x6 wood posts or other suitable wood support structure. The wood in the supporting structure shall have a specific gravity of 0.50 or greater (Southern Yellow Pine or better) and a minimum thickness to allow full penetration of the bracket mounting screws. Conventional 4x4 and 6x6 wood posts or other wood supports are outside the scope of this report.





## 6.0 CONDITIONS OF USE

**6.1** Installation must comply with this Research Report, the manufacturer's published installation instructions, and the applicable Code. In the event of a conflict, this report governs.

**6.2** Conventional wood supports 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 railbrackets. Where required by the building official, engineering calculations and details shall be provided.

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

**6.4** Compatibility of the supporting construction materials with all fasteners, metal post mount components, and other hardware components is subject to approval by the building code official.

**6.5** Only those types of fasteners and fastening methods described in this report have been evaluated for the installation of *TimberTech*® guard systems; other methods of attachment are outside the scope of this report.

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

**6.7** The guard systems produced by *TimberTech*® identified in this report have not been evaluated for use in areas subject to Formosan termite attack.

**6.8** The *TimberTech*® guard systems are manufactured under a quality control program with inspections by Intertek Testing Services NA, Inc..

## 7.0 SUPPORTING EVIDENCE

**7.1** Drawings and installation instructions submitted by the manufacturer.

**7.2** Reports of testing and engineering analysis demonstrating compliance with the requirements of ICC-ESAC174, Acceptance Criteria for Deck Board Span Ratings and Guard Systems (Guards and Handrails), revised December 2014.

**7.3** The reports of testing and engineering analysis demonstrating compliance with the performance requirements of ASTM D 7032-17 Standard Specification for Establishing Performance Ratings for Wood-Plastic Composite Deck Boards and Guardrail Systems (Guards or Handrails).

**7.4** Documentation of an Intertek approved quality control system for the manufacturing of products recognized in this report.

**7.5** Intertek Listing Report "[AZEK Company - TimberTech Guardrail Systems](#)", on the [Intertek Directory of Building Products](#)

## 8.0 IDENTIFICATION

**8.1** The *TimberTech*® guards produced in accordance with this report shall be identified with labeling on the individual components or the packaging that includes the following information:

**8.1.1** The manufacturer's name, address, the product name,

**8.1.2** The following statement: "ASTM D7032 CCRR-0114 See Use and performance levels at [www.bpdirectory.intertek.com](http://www.bpdirectory.intertek.com)"

**8.1.3** The Intertek Control Number, the Intertek Mark as shown below, and the Code Compliance Research Report Number (CCRR-0114).





**9.0 OTHER CODES**

This section is not applicable.

**10.0 CODE COMPLIANCE RESEARCH REPORT USE**

**10.1** 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.

**10.2** Code Compliance Research Reports shall not be used in any manner that implies an endorsement of the product by Intertek.

**10.3** Reference to the [bpdirectory.intertek.com](http://bpdirectory.intertek.com) is recommended to ascertain the current version and status of this report.

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TABLE 1 - RAILING SYSTEM BUILDING CODE RECOGNITION

Guard Systems	Support Rail	Type of System	Maximum Guard System Dimensions	Occupancy Use
<b>TimberTech® Classic Composite</b> <b>RadianceRail® Trademark Premier</b>	With composite support rail	Level/In-Line Application <sup>(1)</sup>	91" x 42"	IBC (All Use Groups) and IRC (Residential)
		Level/45° Application <sup>(1)</sup>		
		Stair Systems <sup>(2)</sup>		
	With aluminum support rail	Level/In-Line Application <sup>(1)</sup>	114-1/2" x 42"	
Stair Systems <sup>(2)</sup>				
<b>TimberTech® Classic Composite</b> <b>Drink Rail Contemporary Rail</b>	With composite support rail	Level/In-Line Application <sup>(1)</sup>	91" x 42"	IBC (All Use Groups) and IRC (Residential)
		Stair Systems <sup>(2)</sup>	78" x 42"	
	With aluminum support rail	Level/In-Line Application <sup>(1)</sup>	114" x 42"	
		Stair Systems <sup>(2)</sup>		
<b>TimberTech® Reserve</b>	With aluminum support rail	Level/In-Line Application <sup>(1)</sup>	114-1/2" x 42"	IBC (All Use Groups) and IRC (Residential)
		Stair Systems <sup>(2)</sup>		
	With composite support rail	Level/In-Line Application <sup>(1)</sup>	92" x 42"	
		Stair Systems <sup>(2)</sup>		
<b>TimberTech® RadianceRail® Express</b>	None	Level/In-Line Application <sup>(1)</sup>	91-3/4" x 42"	IBC (All Use Groups) and IRC (Residential)
		Level/45° Application <sup>(1)</sup>	90" x 42"	
		Stair Systems <sup>(2)</sup>	86-3/8" x 42"	

- <sup>(1)</sup> Level Railing lengths are maximum clear length between supports. Railing height is the minimum installed height from walking surface to top of top rail.
- <sup>(2)</sup> Stair Railing lengths are maximum clear length along the slope between supports. Stair Heights are measured vertically from the leading edge of the stair nose.





TABLE 2 - RAIL DESCRIPTIONS

Guard System	Rail Description
<p><i>TimberTech® Classic Composite</i>  <i>RadianceRail® Trademark Premier</i></p> <p><i>TimberTech® Reserve</i></p>	<p>Top rails are an assemblage of two components: A top rail profile (Figures 6, 7, or 8) with an inner support rail(Figure 1).</p> <p>Top rails and support rails are fastened together with four equally spaced #8 x 2” long coated screws that pass through pre-drilled holes in the baluster side support rail and threaded into the top rail.</p> <p>Bottom rails are an assemblage of two components; A universal rail profile (Figures 6, 7, or 8) with an innersupport rail (Figure 1).</p> <p>A composite support rail is used for rail lengths up to 92 inches. An aluminum support rail is used with the top rail for raillengths exceeding 92 inches.</p>
<p><i>TimberTech® RadianceRail® Express</i></p>	<p>Top and Bottom rails have co-extruded wood-plastic composite “breadloaf” profiles that consist of pre-routed holes to receive balusters.</p>
<p><i>TimberTech® Classic Composite</i>  <i>Drink Rail</i>  <i>Contemporary Rail</i></p>	<p>Top rails are an assemblage of three components; A deck board profile<sup>(1)</sup>, universal rail profile, and innersupport rail. See Figure 5 for rail profiles, and Figure 1 for support rail.</p> <p>For level rails, the deck board profile<sup>(1)</sup>, universal rail and support rails are fastened together with one #8-18 (0.122 inch minor diameter) by 2 inch long pan-head, carbon steel screw, spaced every 15 inches.</p> <p>For stair rails, the deck board profile<sup>(1)</sup>, universal rail and support rails are fastened together with one#8-18 (0.122 inch minor diameter) by 2-5/8 inch long pan-head, carbon steel screw, spaced every 15 inches.</p> <p>An upper composite support rail is used for rail lengths up to 91 inches. An aluminum support rail is used for raillengths exceeding 114 inches.</p> <p>Bottom rails are an assemblage of two components; A universal rail profile with a composite inner support rail. Theuniversal rail is slip fit over the inner support rail.</p>

<sup>(1)</sup> Deck board profiles permitted to be used as top rail cap are the TimberTech® solid deck boards recognized and listed in Intertek Code Compliance Research Report, CCRR-0128 and CCRR-0101 Grooved and scalloped deck boards shall not be used for top rail caps. See Figure 3 and 4 for limitations.





TABLE 3 - INFILL DESCRIPTIONS

Guard System	Infill Options	Infill Fastening Description
<b>TimberTech® Classic Composite</b> <b>RadianceRail® Trademark Premier</b>  <b>TimberTech® Reserve</b>  <b>TimberTech® Classic Composite</b> <b>Contemporary Rail</b> <b>Drink Rail</b>	Nominal 1.25" square Expanded cellular PVC core. See Figures 9 and 16.	<p>A solid PVC composite baluster with an expanded core with a drilled pilot hole at its center to provide a means for locating a fastener.</p> <p>Balusters are held-in-place with coated screws inserted through pre-drilled holes in the upper support and lower rail sections. For all balusters, one #8 x 3" long coated screw is utilized in the top and one #8 x 2" long coated screw is used through the lower rail.</p>
	<i>Feeney® CableRail™</i> with <i>Quick-Connect®</i> fittings, and 3/4 inch sq. aluminum intermediate balusters. See Figure 17.	<p>Stainless steel cables are attached to each post sleeve with Quick-Connect® fittings one fixed and one swivel on opposite ends. Cables are installed at 3" on center and 3-1/16" on center for level and stair rails, respectively.</p> <p>Intermediate, 3/4 inch square, 0.062 inch wall thickness, aluminum balusters are spaced no greater than 30 inches on center along the length of the rail. Balusters are secured to the bottom rail with one #10-12 x 2" pan-head stainless steel screw and the top rail utilizing an intermediatebase plate (attaches to the baluster with one #10-12 x 1" flat-head stainless steel screw and attaches to the top rail with two #10-12 x 1" flat-head stainless steel screws.</p>
	3/4 inch diameter or square hollow, aluminum balusters. See Figure 18.	<p>Aluminum balusters are attached to the top and bottom rails with #8 x 2" and #8 x 3" stainless steel (Series 300) pan head screws</p>
<b>TimberTech® RadianceRail® Express</b>	<p>Nominal 1.25" square, hollow, co-extruded PVC baluster. See Figure 20.</p> <p>3/4 inch diameter aluminum balusters. See Figure 16.</p>	<p>The top and bottom rails include pre-routed holes to receive balusters.</p>



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PCA-101



TABLE 4 - RAIL/BACKET FASTENING SCHEDULE

Guard System		Rail Bracket to Rails	Foot Block to Bottom Rail	Rail Bracket to Post
<b>TimberTech® Classic Composite</b> <b>RadianceRail® Trademark Premier</b>  <b>TimberTech® Reserve</b>  <b>TimberTech® Classic Composite</b> <b>Contemporary Rail Drink Rail</b>		<u>Composite Support Rail:</u> Four-Hole bracket (Figure 13) is attached to each end of the top and bottom support rail using four #8 x 0.75" coated steel pan-head screws.	One #8 x 2" pan-head screw. See Figure 10 through Figure 16	<u>Plastic Support Blocks to Posts:</u> Two #8 x 3" pan-head screws per block. One support block for each end of the lower support rail for level assemblies. Two support blocks are used at the top of the rail for stair assemblies located on the posts where the support rails meet the posts.
		<u>Aluminum Support Rail:</u> Four-Hole bracket (Figure 13) is attached to each end of the top and bottom support rail using four #8 x 0.75" stainless steel (300 series) pan-head screws.		<u>Metal-Reinforced Plastic Mounting Bracket to Posts:</u> Two #8 x 3" coated pan-head screws.
<b>RadianceRail® Express</b>	Level & 45°	One stainless steel "L" bracket is attached to each end of the top and bottom rails using three #10 x 1-5/8" pan-head screws.	One #10 x 3" pan-head screw.	<u>Stainless Steel "L" Bracket to Posts:</u> Two #10 x 1-5/8" pan-head screws.
	Stair	<u>Acute Angle Bracket</u> , (Figure 14c) Two #10 x 1-5/8" pan-head screws <u>Obtuse Angel Bracket</u> , (Figure 14b) Two #10 x 1" pan-head screws		





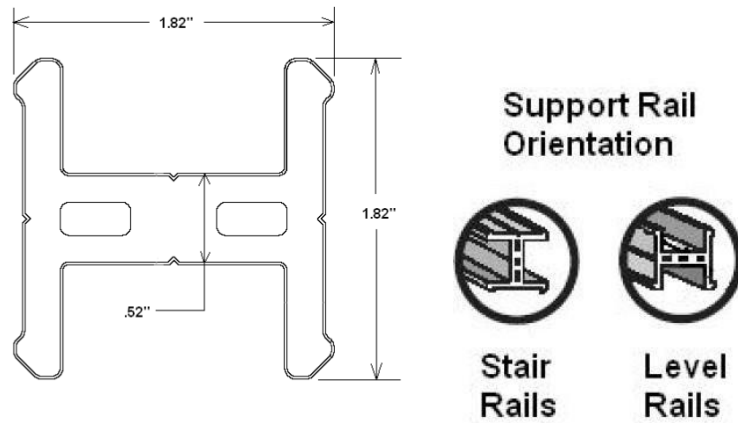


FIGURE 1 – SUPPORT RAIL

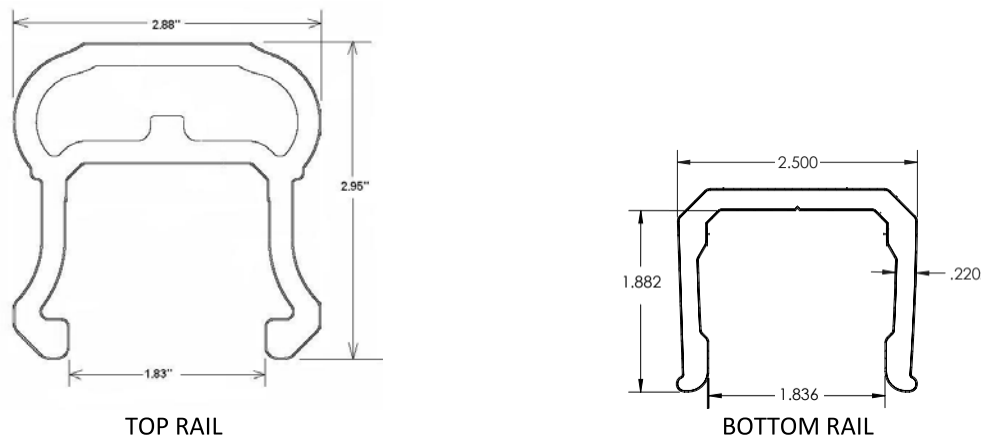
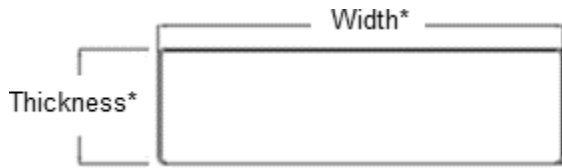
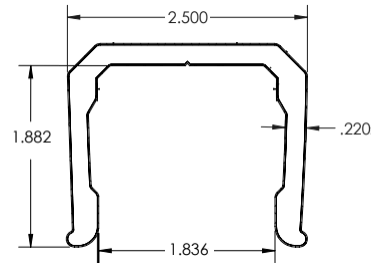
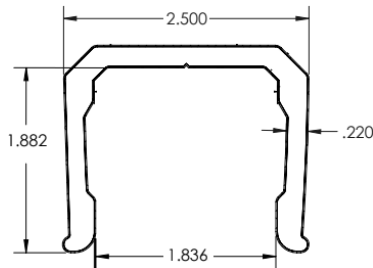


FIGURE 2 – CLASSIC COMPOSITE SERIES RADIANCERAIL®



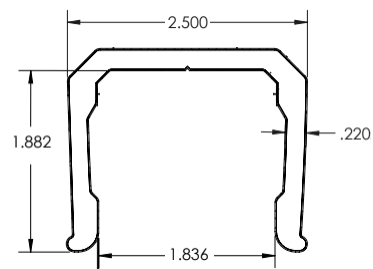
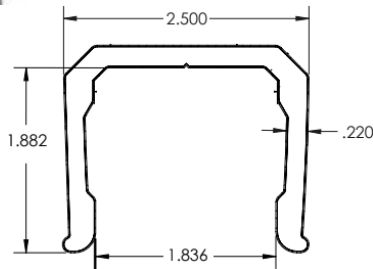
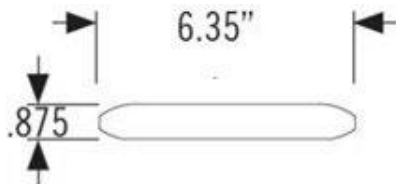
\*Deck board profiles permitted to be used as top rail cap are the solid deck boards recognized and listed in Intertek Code Compliance Research Report, Intertek CCRR-0128 with minimum width of 3.5 inches and 1 inch thickness, or Intertek CCRR-0101 with minimum width of 5.4 inches and 0.89-inch thickness. Grooved and scalloped deck boards shall not be used for top rail caps.



TOP RAIL ASSEMBLY

BOTTOM RAIL

FIGURE 3 – CLASSIC COMPOSITE SERIES DRINK RAIL

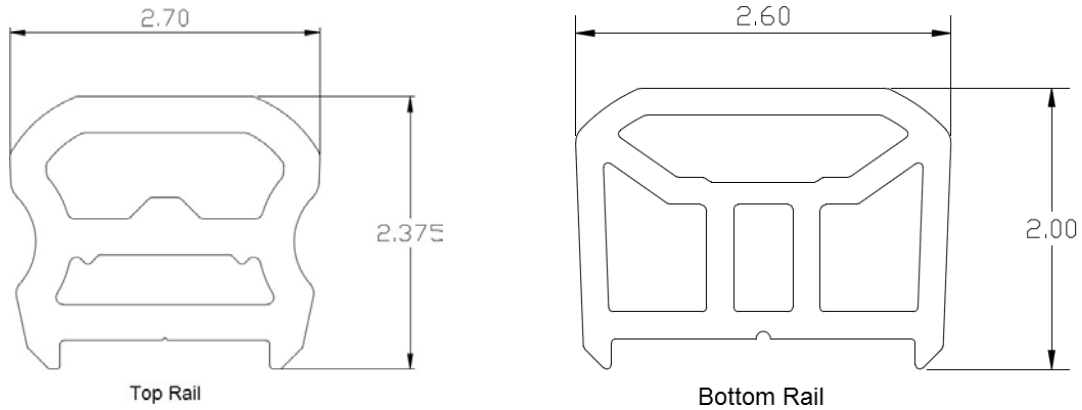


TOP RAIL ASSEMBLY

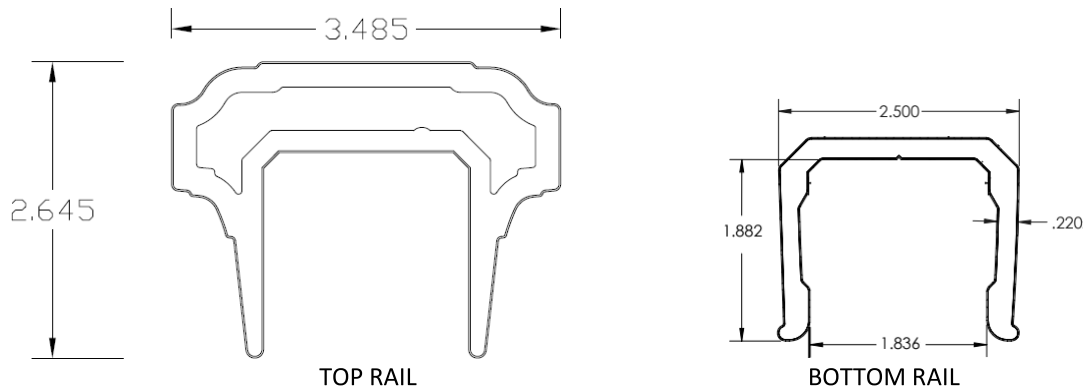
BOTTOM RAIL

FIGURE 4 – CLASSIC COMPOSITE SERIES CONTEMPORARY RAIL

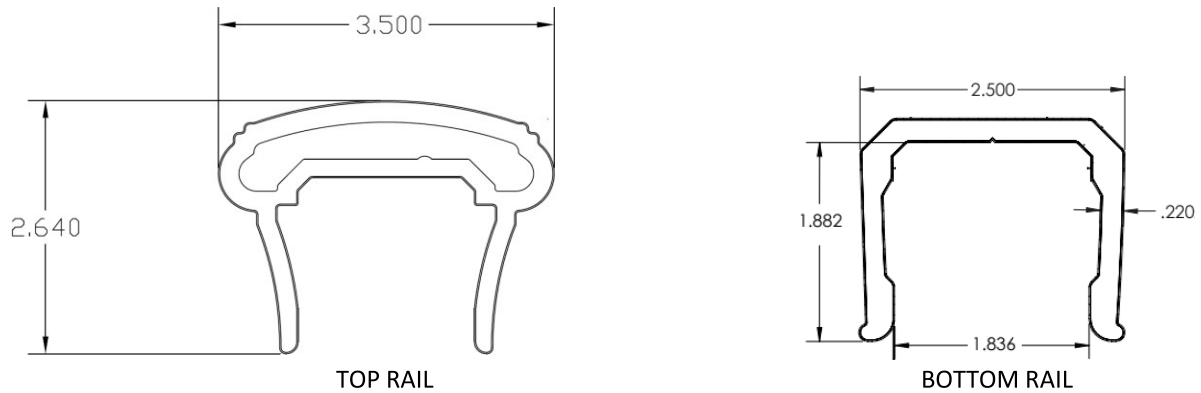




**FIGURE 5 - RADIANCERAIL® EXPRESS, RAIL PROFILES**



**FIGURE 6 – CLASSIC COMPOSITE SERIES PREMIER RAIL PROFILES**



**FIGURE 7 – CLASSIC COMPOSITE SERIES TRADEMARK RAIL PROFILES**

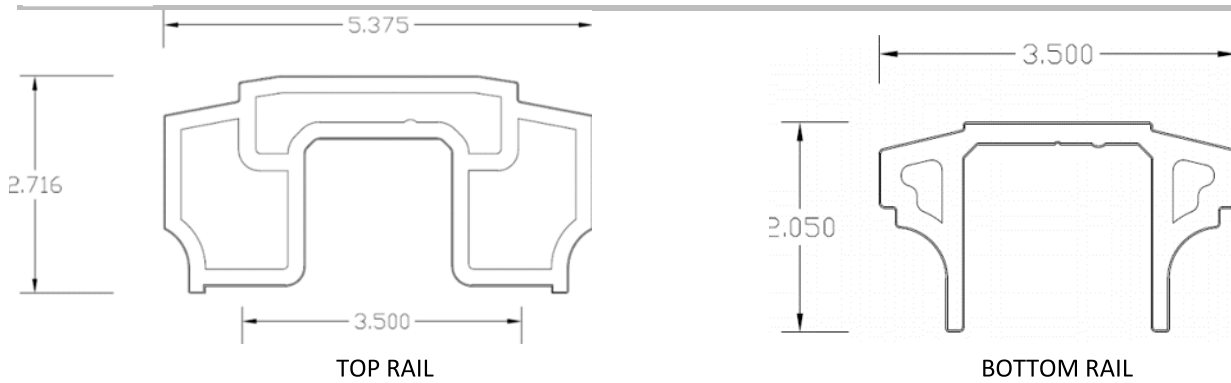


FIGURE 8 – RESERVE RAIL PROFILES

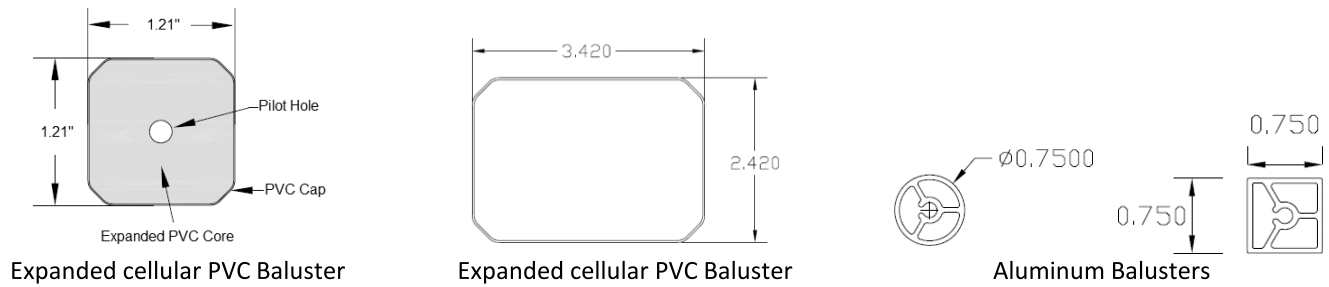


FIGURE 9 - RADIANCERAIL® PREMIER, TRADEMARK, AND RESERVE BALUSTER PROFILES

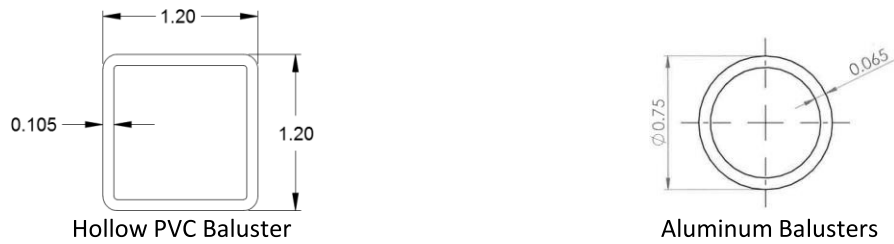


FIGURE 10 - RADIANCERAIL® EXPRESS BALUSTER PROFILE

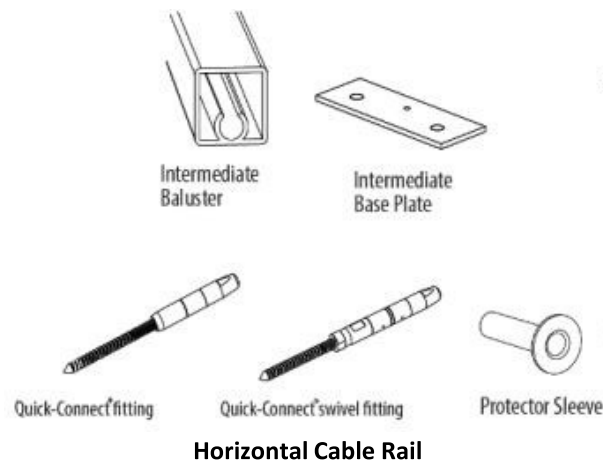
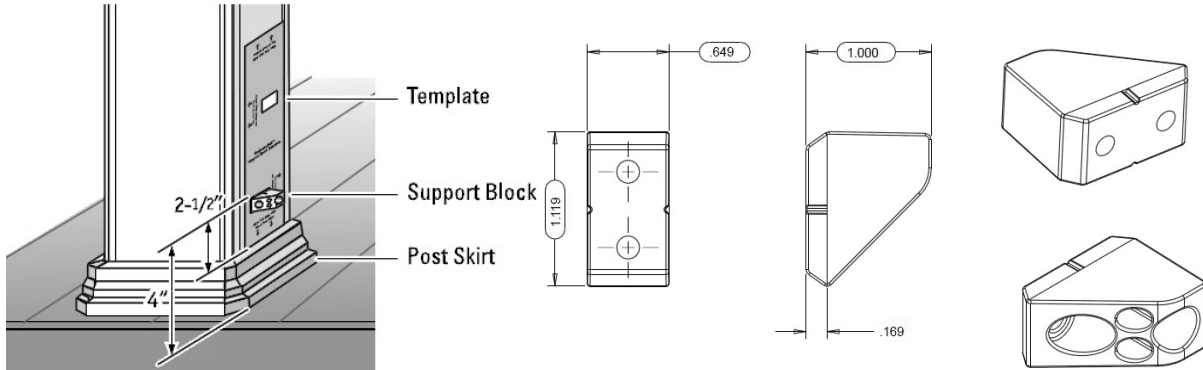
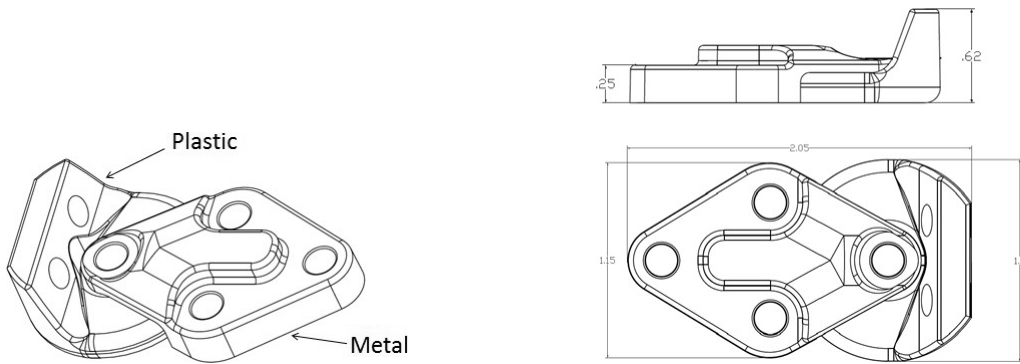


FIGURE 11 – CLASSIC COMPOSITE SERIES CONTEMPORARY RAIL INFILL

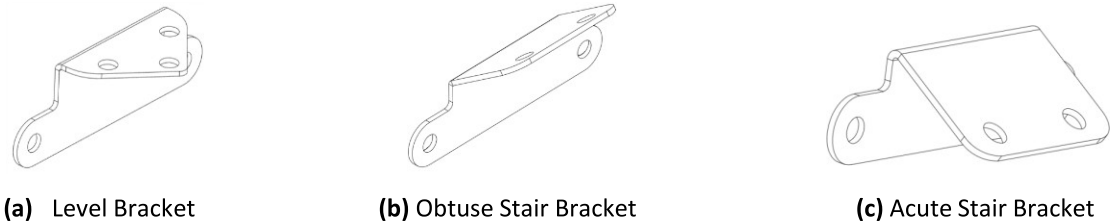




**FIGURE 12 - RADIANCERAIL® SUPPORT BLOCK**



**FIGURE 13 – FOUR-HOLE BRACKET**  
*TimberTech® Classic Composite Series, Reserve Rail*



**FIGURE 14 - RADIANCERAIL® EXPRESS BRACKETS**

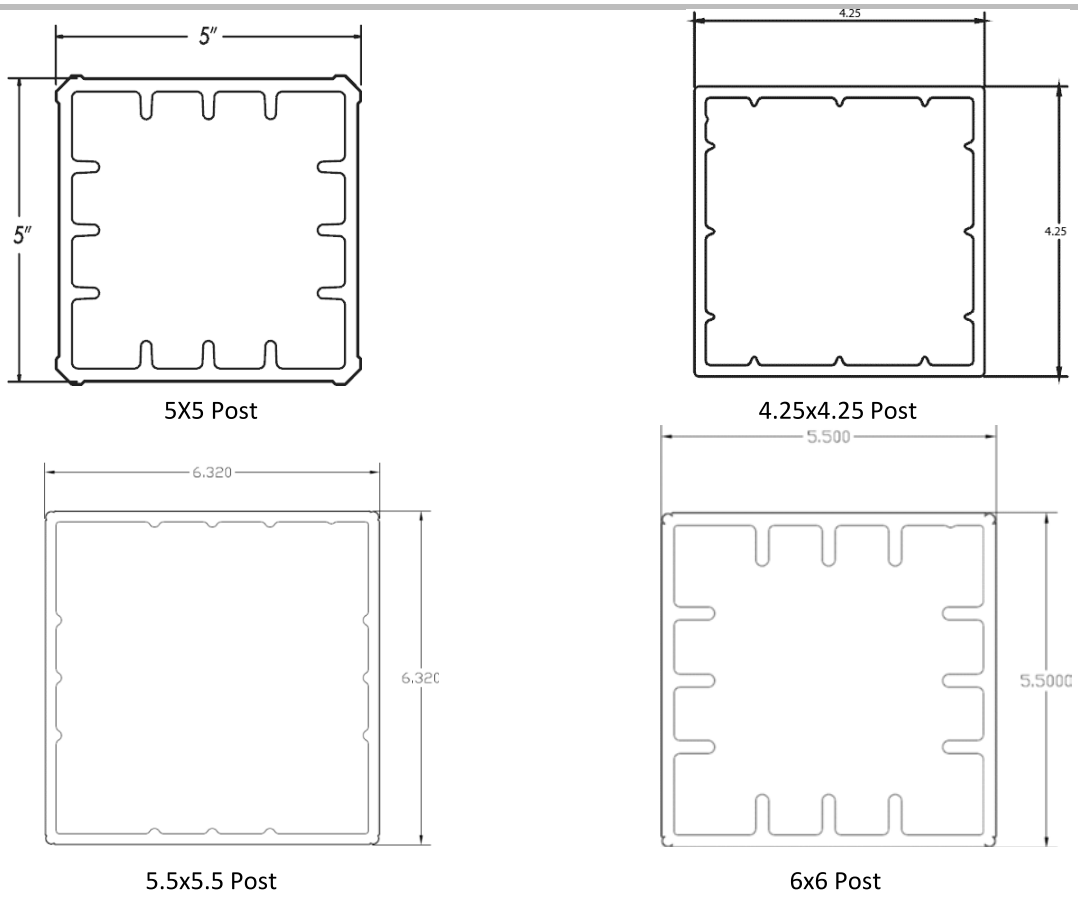
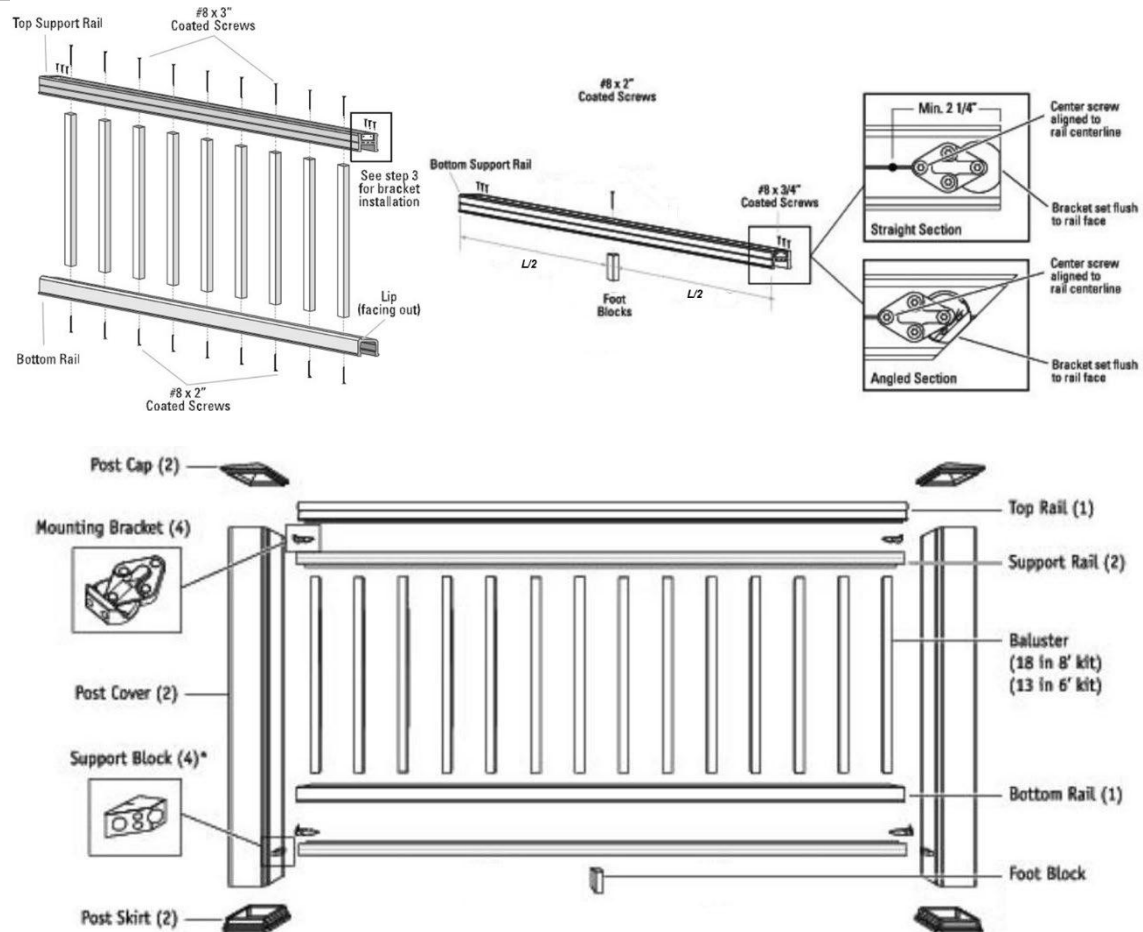


FIGURE 15 - POST SLEEVE PROFILES FOR 4X4 OR 6X6 WOOD POSTS



**FIGURE 16 – TIMBERTECH® CLASSIC COMPOSITE SERIES AND RESERVE RAIL**  
 Level Assembly with Expanded Cellular PVC Balusters

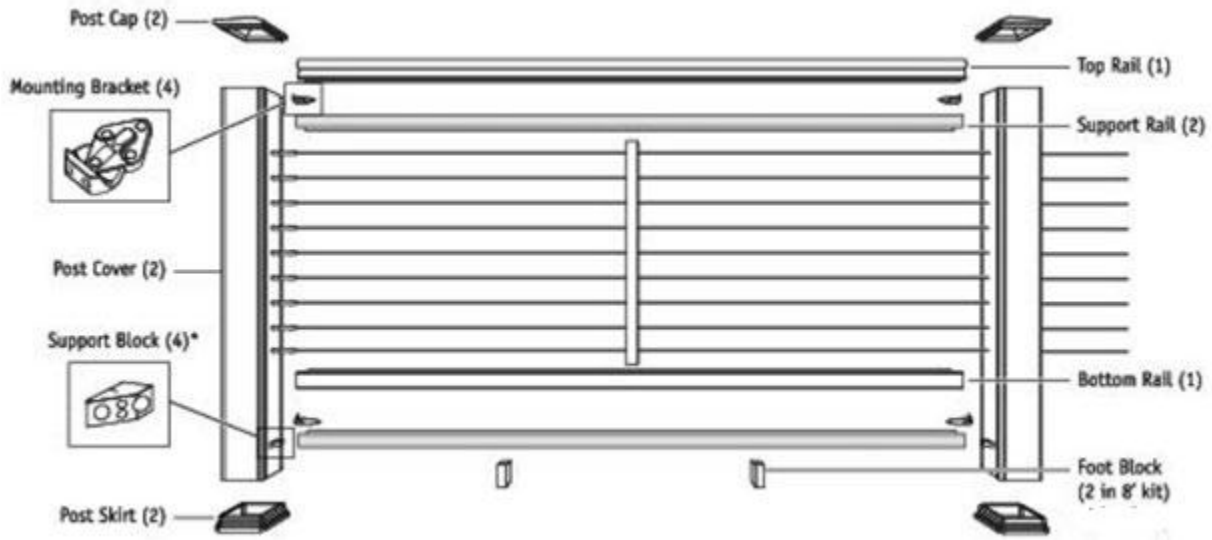


FIGURE 17 – **TIMBERTECH® CLASSIC COMPOSITE SERIES AND RESERVE LEVEL ASSEMBLY WITH FEENEY® CABLERAIL™**

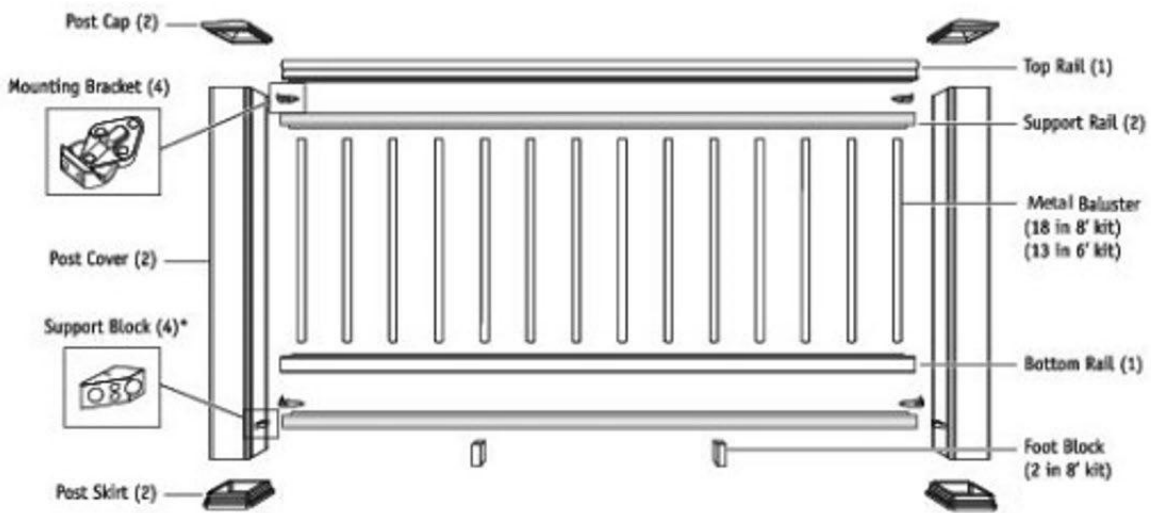


FIGURE 18 – **TIMBERTECH® CLASSIC COMPOSITE SERIES AND RESERVE LEVEL ASSEMBLY WITH ALUMINUM BALUSTERS**



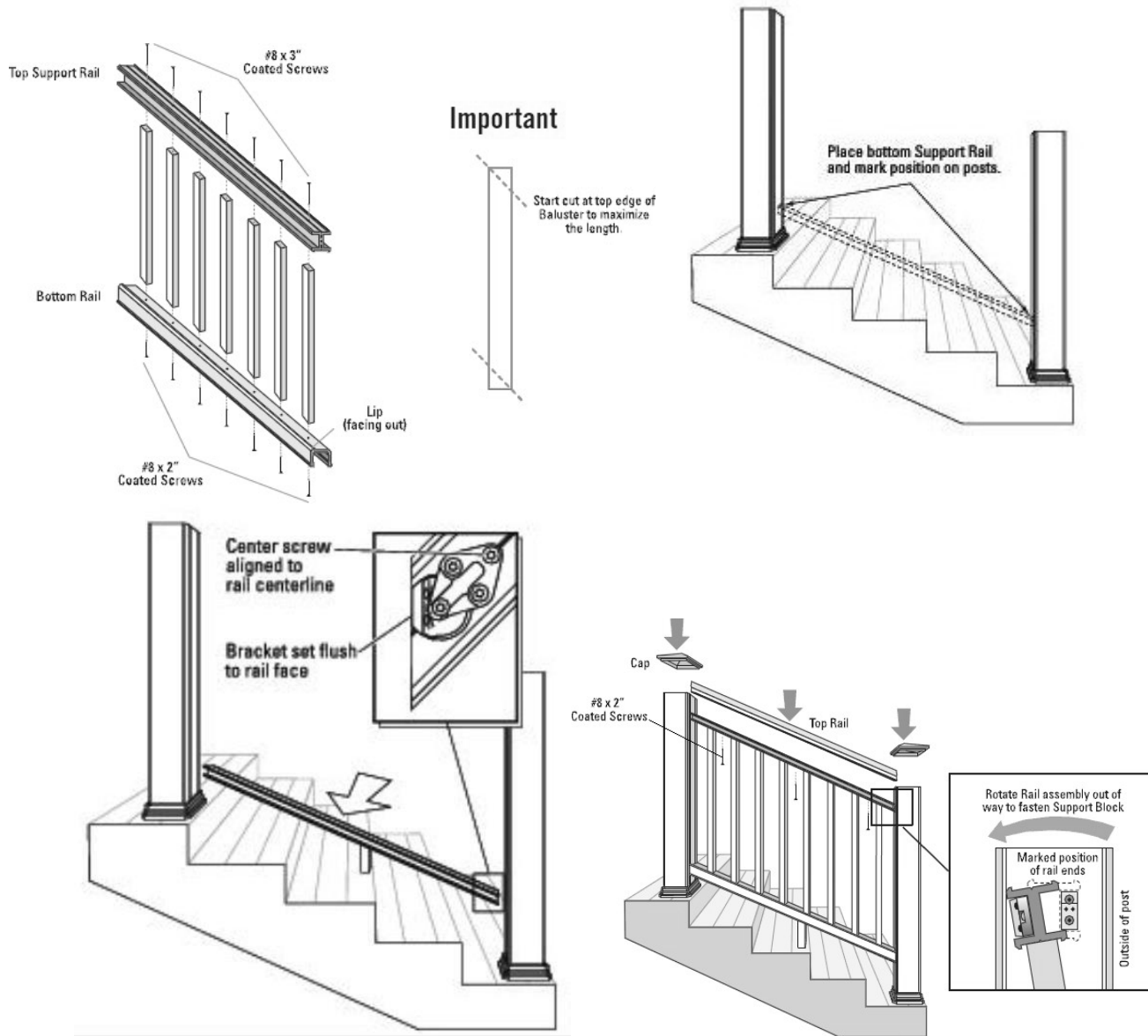


FIGURE 19 - TIMBERTECH® CLASSIC COMPOSITE SERIES AND RESERVE TYPICAL STAIR ASSEMBLY

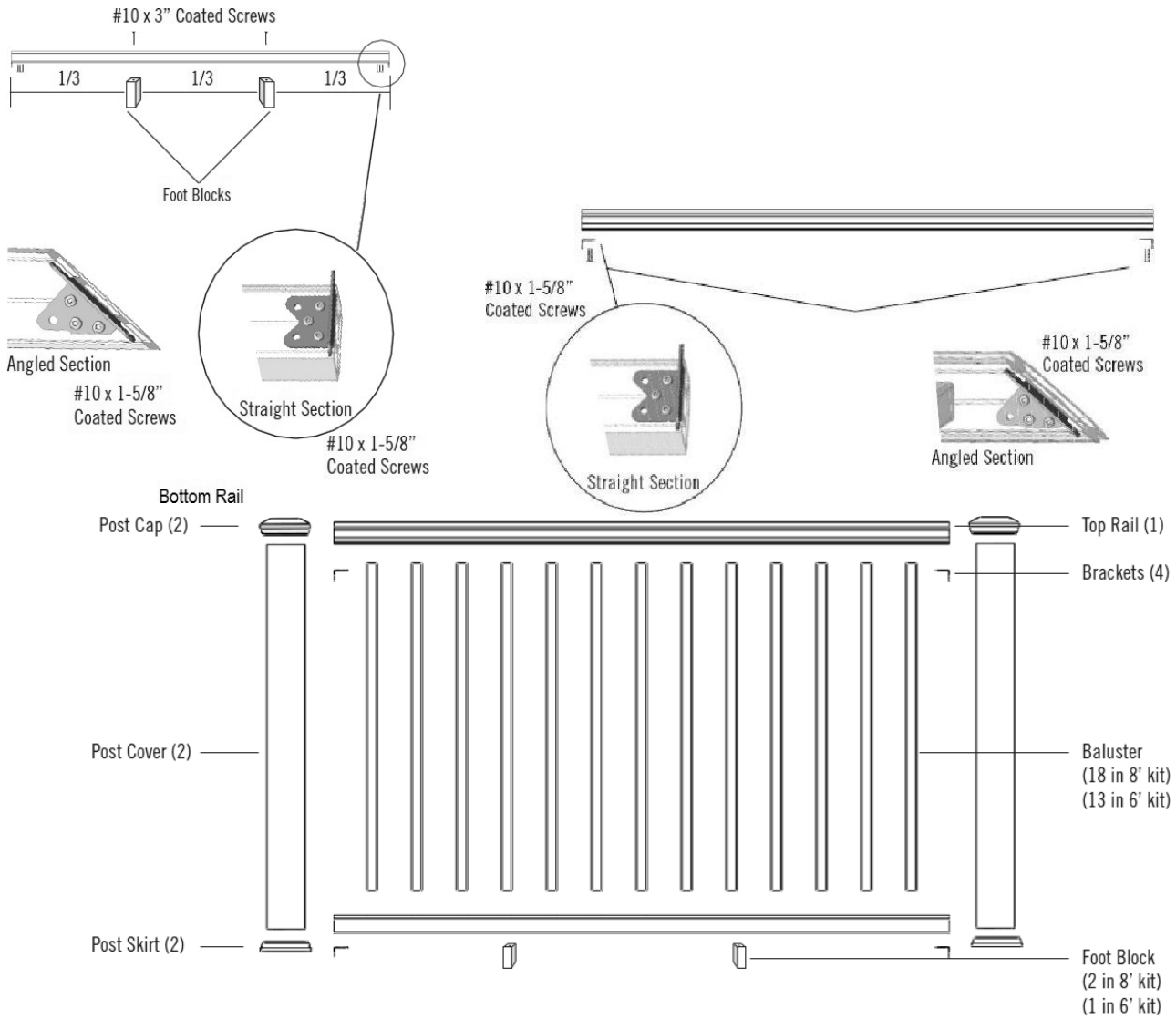


FIGURE 20 - RADIANCE RAIL® EXPRESS TYPICAL LEVEL ASSEMBLY

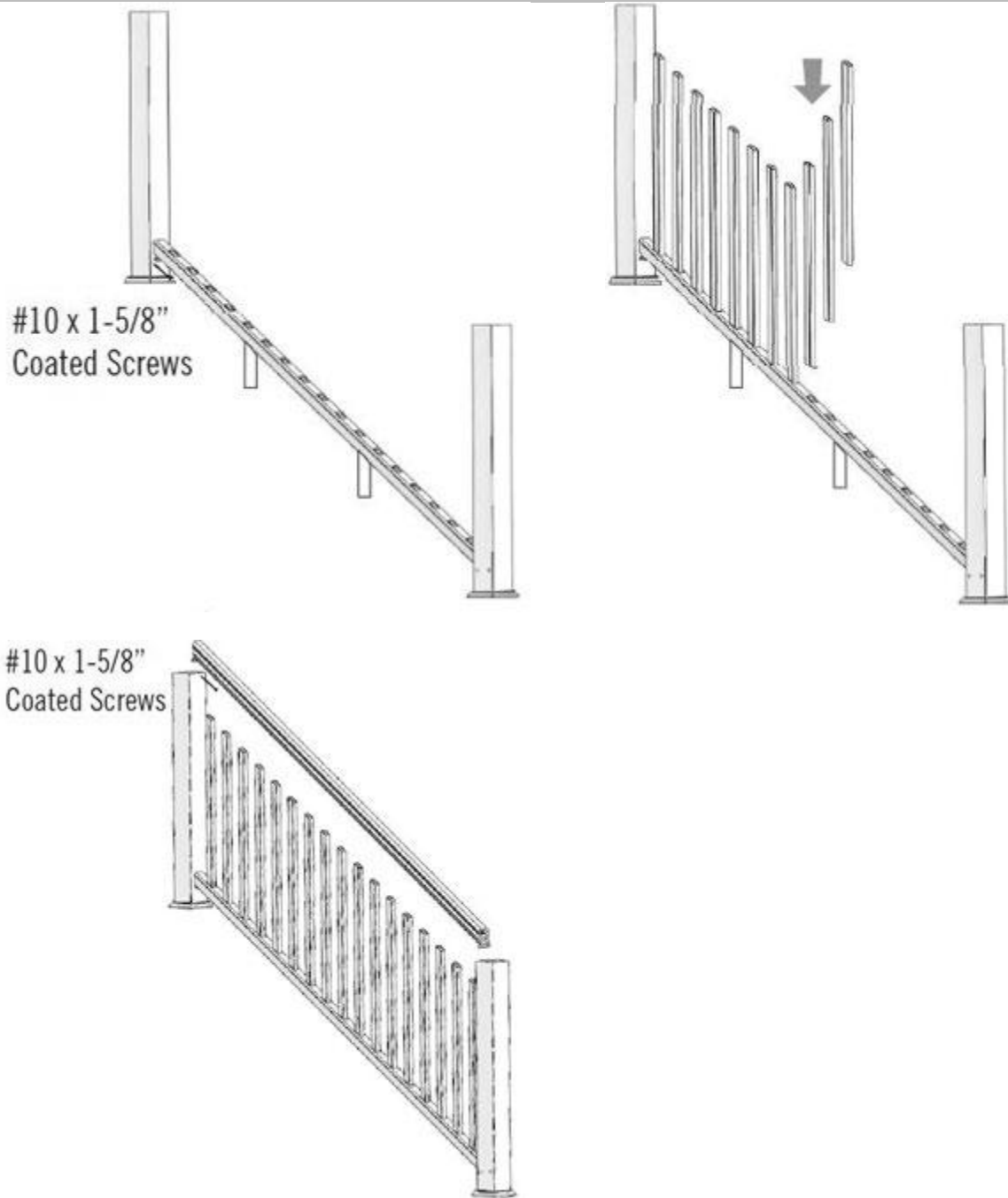
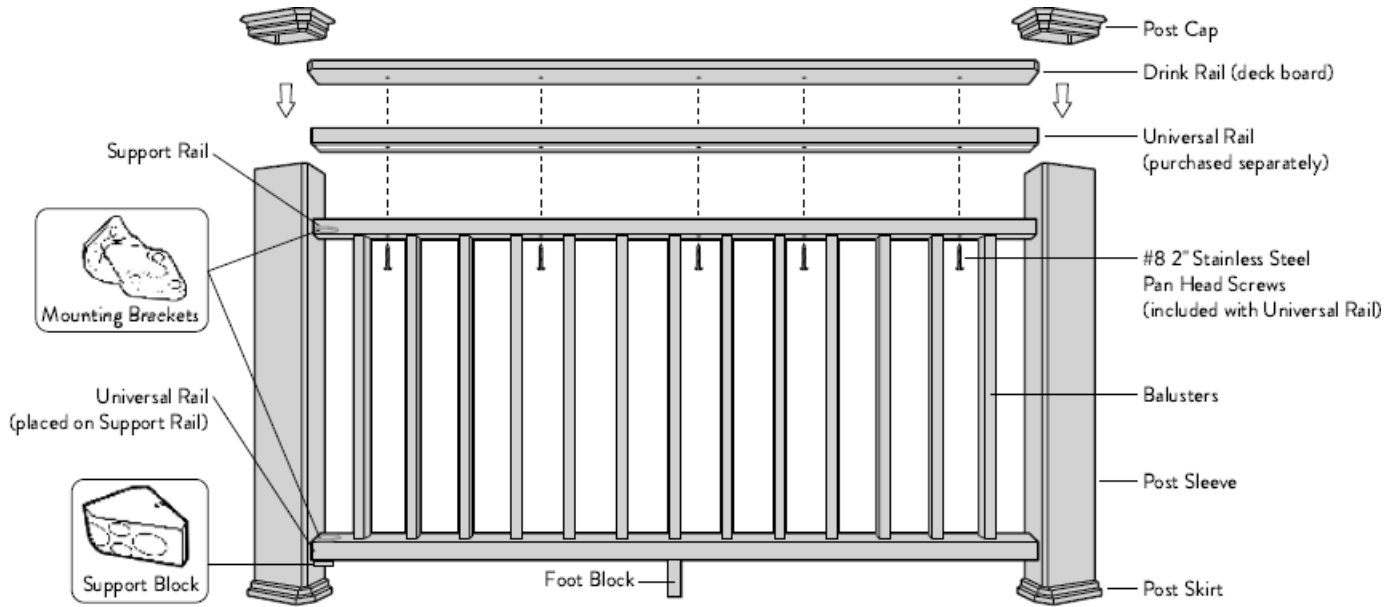


FIGURE 21 - *RADIANCERAIL*® EXPRESS TYPICAL STAIR ASSEMBLY



**FIGURE 22 – TIMBERTECH® CLASSIC COMPOSITE SERIES DRINK RAIL / CONTEMPORARY RAIL TYPICAL ASSEMBLY**  
*Drink Rail / Contemporary Rail may be installed in an over the post configuration.*