ICC-ES Evaluation Report

ESR-4217

Reissued September 2024

This report also contains:

- FL Supplement

Subject to renewal September 2025

DIVISION: 05 00 00 - METALS Section: 05 52 00—Metal Railings	REPORT HOLDER: AZEK BUILDING PRODUCTS LLC	EVALUATION SUBJECT: THE IMPRESSION RAIL EXPRESS ALUMINUM RAILING SYSTEM SERIES CLASSIC AND MODERN; VERTICAL CABLE SYSTEM; HORIZONTAL CABLE SYSTEM; AND ADA HANDRAIL SYSTEM	

1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2024, 2021, 2018, 2015, 2012, 2009, and 2006 *International Building Code*® (IBC)
- 2024, 2021, 2018, 2015, 2012, 2009, and 2006 *International Residential Code* (IRC)
- 2013 *Abu Dhabi International Building Code* (ADIBC)†

†The ADIBC is based on the 2009 IBC as referenced under the ADIBC.

Every code reference in this report is related to 2024 IBC and IRC. See Table 2 for previous code editions of the IBC and IRC.

Property evaluated:

- Structural

2.0 USES

The Impression Rail Express (IRX) Aluminum Railing System Series Classic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System described in this report are limited to exterior or interior use as a guardrail system for balconies, porches, and decks of residential and non-residential buildings constructed in accordance with the IBC and IRC.

3.0 DESCRIPTION

3.1 Mounting Systems:

3.1.1 Aluminum Posts:

The IRX Aluminum Railing System can be supported to the substrate with aluminum posts, where the posts are available in 2-inch (51 mm) square or 3-inch (76 mm) square. Each post is produced from 6005A-T5 aluminum alloy. The post caps are produced from A380 aluminum alloy. The base plates for the 2-inch (51 mm) square post are available in a 4-inch by 4-inch (102 mm by 102 mm) or 5-inch by 5-inch (127 mm by 127 mm) square; the base plates for the 3-inch (76 mm) square post are available in 5-inch by 5-inch (127 mm by 127 mm) square. Each base plate is produced from A369 aluminum alloy.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 1, 4, 5, 6, 7 and 8 for details.

3.1.2 ADA mounting system:

ADA mounting systems consist of A369 aluminum alloy cast-in-place 90° wall returns and mid supports, while the ADA handrails are produced from extruded 6063-T5 aluminum alloy round hollow pipe.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 2 for details.

3.2 Guard – In-fill Systems: Each in-fill system may be installed with available top rail models indicated in Figure 4 of this report.

3.2.1 The IRX Aluminum Railing System:

The IRX Aluminum Railing System are guards consisting of a sub-rail panel with top and bottom channel rails and balusters, bottom-rail support leg and top and bottom rail covers. The top and bottom channel rails and balusters are produced from 6063 - T52 aluminum alloy, and the top and bottom rail covers are produced from 6063-T5 aluminum alloy.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 1 for details and Table 1 for maximum spans.

The IRX Aluminum Railing System is available in two different series: Classic and Modern.

3.2.2 Vertical Cable System:

The Vertical Cable System are guards consisting of extruded aluminum posts and vertical infill with stainless steel wire ropes and top and bottom channel rails. The stainless-steel wire rope is 316SS $^{1}/_{8}$-inch (3.2 mm) diameter (7x19), the support rods are 316SS or 2205SS, with 5051A or 6063-T5 aluminum ferrules top and bottom, with solid supports made of 304SS. The tensioning system material is POM or A380 alloy, with 18-8 stainless tensioning screws. The IRX Aluminum Railing components are produced from 6063-T5 aluminum alloy.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 3A for details and Table 1 for maximum spans.

3.2.3 Horizontal Cable System:

The Horizontal Cable System are guards consisting of extruded aluminum posts and horizontal infill with stainless steel wire strands, top and bottom channel rails, and support picket. The stainless steel wire strand is 316SS $^{1}/_{8}$-inch (3.2 mm) diameter (1x19), the support picket is 316SS or 2205SS, with aluminum ferrules on one end, and 316 stainless fittings on the other end. The aluminum railing components are produced from 6063-T5 aluminum alloy, the posts are produced from 6005A-T5 aluminum alloy. The Horizontal Cable System is available in one series: Horizontal Cable.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 3B for details and Table 1 for maximum spans.

3.3 ADA Handrail System:

The ADA Handrail System consists of a handrail that is an extruded aluminum round hollow pipe in 6063-T5 aluminum alloy.

The minimum yield and tensile strengths, minimum thickness of the railing components, and manufacturing extrusion process are specified in the approved quality control documentation. The railing components are available in a white, black, bronze, or custom powder coated finish. See Figure 2 for details and Table 1 for maximum spans.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The IRX Aluminum Railing System Series Classic and Modern; Vertical Cable System; and Horizontal Cable System are satisfactory to resist loads specified in Section 1607.9 of the IBC and IRC Table R301.5, when installed at the maximum clear distance between the posts as noted in Table 1. When the railing is supported on one or both ends by the supporting structure, the maximum clear distance between the post and the supporting structure or between the supporting structures must comply with the spans noted in Table 1.

The ADA Handrail System is satisfactory to resist loads specified in Section 1607.9 of the IBC and IRC Table R301.5. The maximum clear distance between the supports is 72 inches (1828 mm); see Table 1 for maximum spans.

4.2 Installation:

Installation must be in accordance with the manufacturer's published installation instructions, this report, and guard height and opening limitations provisions specified in Sections 1014 and 1015 of the IBC and Sections R311 and R312 of the IRC, as applicable. The manufacturer's published installation instructions must be available at the jobsite at all times during installation.

Between the post with infill pickets: The sub-rail panel consisting of two h-channels and infill pickets is attached to an extrusion post on each end by installing top and bottom rail connector clips with #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Four screws (two inside and one on each side) per each top and bottom connector clip, as shown in Figure 1. The bottom rail connector clip must be located 3 3/4-inches (95.25 mm) from the top edge of the clip to the bottom of the post base at center. All connector clips must be installed with two #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Each top and bottom rail cover snaps over the sub-rail panel's corresponding top and bottom h-channel. Each support leg is fastened at the midspan of the bottom rail with one #8 x ¾-inch-long (19.05 mm) stainless steel TEK screw.

Between the post or continuous with vertical cable infill: The sub-rail panel consisting of two h-channels and vertical cables with ferrules on each end is attached to an extrusion post on each end by installing top and bottom rail connector clips with #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Four screws (two inside and one on each side) per each top and bottom connector clip, as shown in Figure 3A. The bottom rail connector clip must be located 3 3/4-inches (95.25 mm) from the top edge of the clip to the bottom of the post base at center. All connector clips must be installed with two #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Support rods to be installed at every 5th cable, and cables tensioned with individual tensioning blocks. Each top and bottom rail cover snaps over the sub-rail panel's corresponding top and bottom h-channel. Each support leg is fastened at the midspan of the bottom rail with one #8 x ¾-inch-long (19.05 mm) stainless steel TEK screw.

Between the post or continuous with horizontal cable infill: The sub-rail panel consisting of two h-channels (full frame) or one h-channel (top rail only) and cable lengths is attached to an extrusion post on each end by installing top and/or bottom rail connector clips with #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Four screws (two inside and one on each side) per each top and bottom connector clip, as shown in Figure 3B The bottom rail connector clip must be located 3 3/4-inches (95.25 mm) from the top edge of the clip to the bottom of the post base at center. All connector clips must be installed with two #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screws. Each top and/or bottom rail cover snaps over the sub-rail panel's corresponding top and bottom h-channel. Spans over 4' require support picket, which mounts top and bottom using #8 x 3/4-inch-long (19.05 mm) stainless steel TEK screw into h-channel on top and bottom, or on top and into substrate on bottom. Cables are then run through correlating holes in post, secured on one side by either a threaded swage or swageless fitting, then on other side by a fast fitting. Each support leg (if full frame) is fastened at the midspan of the bottom rail with one #8 x ¾-inch-long (19.05 mm) stainless steel TEK screw.

Continuous top rail: A crossover bracket is secured to the top of each 2-inch (50.8 mm) post with two #8 x 1.5 inch-long (38.1 mm) stainless steel TEK screws. The sub-rail panel consisting of two h-channels and infill pickets is attached to the crossover bracket using two #8 x 3/4-inch-long (19.05 mm) TEK stainless steel screws. Bottom of sub-rail panel is attached with rail connector clips at the bottom as described in between post installations above. Each bottom rail cover snaps over the sub-rail h-channel. Each length of top rail snaps over post and top h-channel. See Figure 1 and 4 for details.

Each extruded post is attached to a post base plate with four M8 x 80 mm long stainless-steel lag screws, which are fastened on the underside of the post base plate, as shown in Figures 5 and 7. The post base plate must be fastened to the supporting wood substrate with a minimum specific gravity of 0.50 using either four – $^{3}/_{8}$-inch x 6-inch long (9.5 mm x 152.4 mm) GRK RSS wood screws or four – $^{5}/_{16}$-inch x 6-inch long (7.9 mm x 152.4 mm) GRK RSS wood screws. When the supporting substrate is concrete having a minimum compressive strength of 3700 psi (25.5 MPa), each post base plate must be fastened to the supporting concrete substrate using four ¼-inch x 3-inch long (6.35 mm by 76.2 mm) corrosion resistant coated concrete anchor bolts.

When the optional 4-inches (101.6 mm) square post sleeve is installed over an existing nominal 4-by-4 (101.6 mm x 101.6 mm) wood post, all wood post fastener connections to the supporting substrate and sub-rail connections through the post sleeve to the wood post must be designed by a registered design professional. See Figure 8 for details.

The ADA Handrail System must have each support attached to the supporting wood substrate with a minimum specific gravity of 0.49. Each 90° Wall Return and mid support is fastened to the wood substrate using three – $^{5}/_{16}$-inch x 4 inch-long (7.9 mm by 101.6 mm) construction lag screws. When each 90° Wall Return and mid support is fastened to 3-inches (76.2 mm) square hollow extruded 6005A-T5 aluminum with a wall thickness of 0.065-inch (1.65 mm), each connection must use three – No. 10 x 1½-inch long (38.1 mm) stainless steel TEK screws. See Figure 2 for details and Table 1 for spans.

When fascia bracket assembly is used in lieu of post base for 3-inch (76.2 mm) square posts installed over the supporting concrete substrate having a minimum compressive strength of 3900 psi (26.9 MPa), the posts with fascia bracket assembly must be fastened to the supporting concrete substrate using four ¼-inch x 3-inch long (6.35 mm by 76.2 mm) corrosion resistant coated concrete anchor bolts. See Figure 6 for details and see Table 1 for spans.

5.0 CONDITIONS OF USE:

The IRX Aluminum Railing System Series Classic and Modern; Vertical Cable System, Horizontal Cable System; and ADA Handrail System described in this report comply with, or are a suitable alternative to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

5.1 This product is limited to exterior or interior use as a guardrail system for balconies, porches, and decks of residential and non-residential buildings constructed in accordance with the IBC and IRC.

5.2 Installation must comply with this report, the manufacturer's published installation instructions and the applicable code. When the manufacturer's published installation instructions differ from this report, this report governs.

5.3 Only those fasteners and fastener configurations described in this report have been evaluated for the installation of the IRX Aluminum Railing System Series Classic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System. The compatibility of the post base plate's fasteners with the supporting construction, including chemically treated wood, is outside the scope of this report.

5.4 The IRX Aluminum Railing System Series Classic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System must be directly fastened to supporting construction having adequate strength and stiffness. Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted for approval. The calculations must 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 must contain details of the attachment to the supporting structure consistent with the requirements of this report. The documents must be prepared by a registered design professional where required by the statutes of the jurisdiction in which the project is to be constructed.

5.5 The top rail of the IRX Aluminum Railing System, for use as a handrail, is outside the scope of this report.

5.6 The products are manufactured under a quality control program with inspections by ICC-ES.

6.0 EVIDENCE SUBMITTED

Data in accordance with the ICC-ES Acceptance Criteria for Handrails and Guards (AC273), dated June 2017 (editorially revised May 2024).

7.0 IDENTIFICATION

7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4217) along with the name, registered trademark, or registered logo of the report holder must be included in the product label.

7.2 In addition, the IRX Aluminum Railing System Series Classic and Modern; Vertical Cable System; Horizontal Cable System; and ADA handrail System described in this report is identified by a stamp, on each individual piece or on the packaging, bearing the report holder's name (AZEK Building Products LLC), the product name (The IRX Aluminum Railing System Series Classic or Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System),the allowable span, and the ICC-ES evaluation report number (ESR-4217).

7.3 The report holder's contact information is the following:

AZEK BUILDING PRODUCTS LLC
894 PRAIRIE AVENUE
WILMINGTON, OHIO 45177
www.AZEKCO.com

TABLE 1—MAXIMUM GUARDRAIL SYSTEM SPANS (CENTER TO CENTER)[1]

MOUNTING SYSTEMS	SYSTEM HEIGHT (INCH)	MAXIMUM SPAN IBC (INCH)	MAXIMUM SPAN IRC (INCH)
3-INCH ALUMINUM POSTS AND 2" ALUMINUM POSTS WITH 5" X 5" BASEPLATE ATTACHED TO WOOD SUBSTRATE[2]	42.000	68.300	91.313
3-INCH ALUMINUM POSTS AND 2" ALUMINUM POSTS WITH 5" X 5" BASEPLATE ATTACHED TO CONCRETE SUBSTRATE[3]	42.000	69.430	91.313
2-INCH ALUMINUM POSTS (4" X 4" BASE PLATE) ATTACHED TO CONCRETE SUBSTRATE[3]	42.000	66.000	91.313
3-INCH ALUMINUM POSTS AND FASCIA BRACKET ASSEMBLY ATTACHED TO CONCRETE SUBSTRATE[6]	42.000	55.960	91.313
ADA90° BRACKET ASSEMBLY ATTACHED TO WOOD SUBSTRATE[4]	N/A	72.000	72.000
ADA 90° BRACKET ASSEMBLY ATTACHED TO 3-INCH ALUMINUM POST WITH BACKER PLATE[5]	N/A	72.000	72.000
ADA MIDSPAN BRACKET ASSEMBLY ATTACHED TO 2-INCH ALUMINUM POST[5]	N/A	72.000	72.000
INFILL SYSTEMS			
IRX ALUMINUM RAILING SYSTEM	42.000	69.430	91.313
ADA HANDRAIL	N/A	72.000	72.000
VERTICAL CABLE	42.000	64.000	91.313
HORIZONTAL CABLE	42.000	64.000	91.313

For SI: 1 inch = 25.4 mm

[1]For all IRX Aluminum Railing System types. Spans are from inside face to inside face of post.

[2]Wood substrate must have a minimum specific gravity of 0.50 where each connection must use either four – 3/8-inch x 6-inch long GRK RSS wood screws for IBC application or four - 5/16-inch x 6 inch-long GRK RSS wood screws for IRC application.

[3]Concrete substrate must have a minimum compressive strength of 3700 psi where each connection must use four - 1/4-inch x 3-inch long concrete anchor bolts supplied by Ultralox.

[4]Wood substrate must have a minimum specific gravity of 0.49 where each connection must use three - 5/16-inch x 4-inch long construction lag screws.

[5]Each connection to aluminum post must use three - No. 10 x 1 ½-inch long stainless steel TEK screws.

[6]Concrete substrate must have a minimum compressive strength of 3900 psi where each connection must use four - ¼-inch x 3-inch-long concrete anchor bolts supplied by AZEK Building Products LLC. See Figure 7 for component details.

TABLE 2—APPLICABLE SECTIONS UNDER EACH EDITION OF THE IBC AND IRC

2024 IBC	2021 IBC	2018 IBC	2015 IBC	2012 IBC	2009 IBC	2006 IBC
Sections 1014 and 1015				Sections 1012 and 1013		
Section 1607.9		Section 1607.8.1			Section 1607.7.1	
2024 IRC	**2021 IRC**	**2018 IRC**	**2015 IRC**	**2012 IRC**	**2009 IRC**	**2006 IRC**
Table R301.5						
Sections R311 and R312						

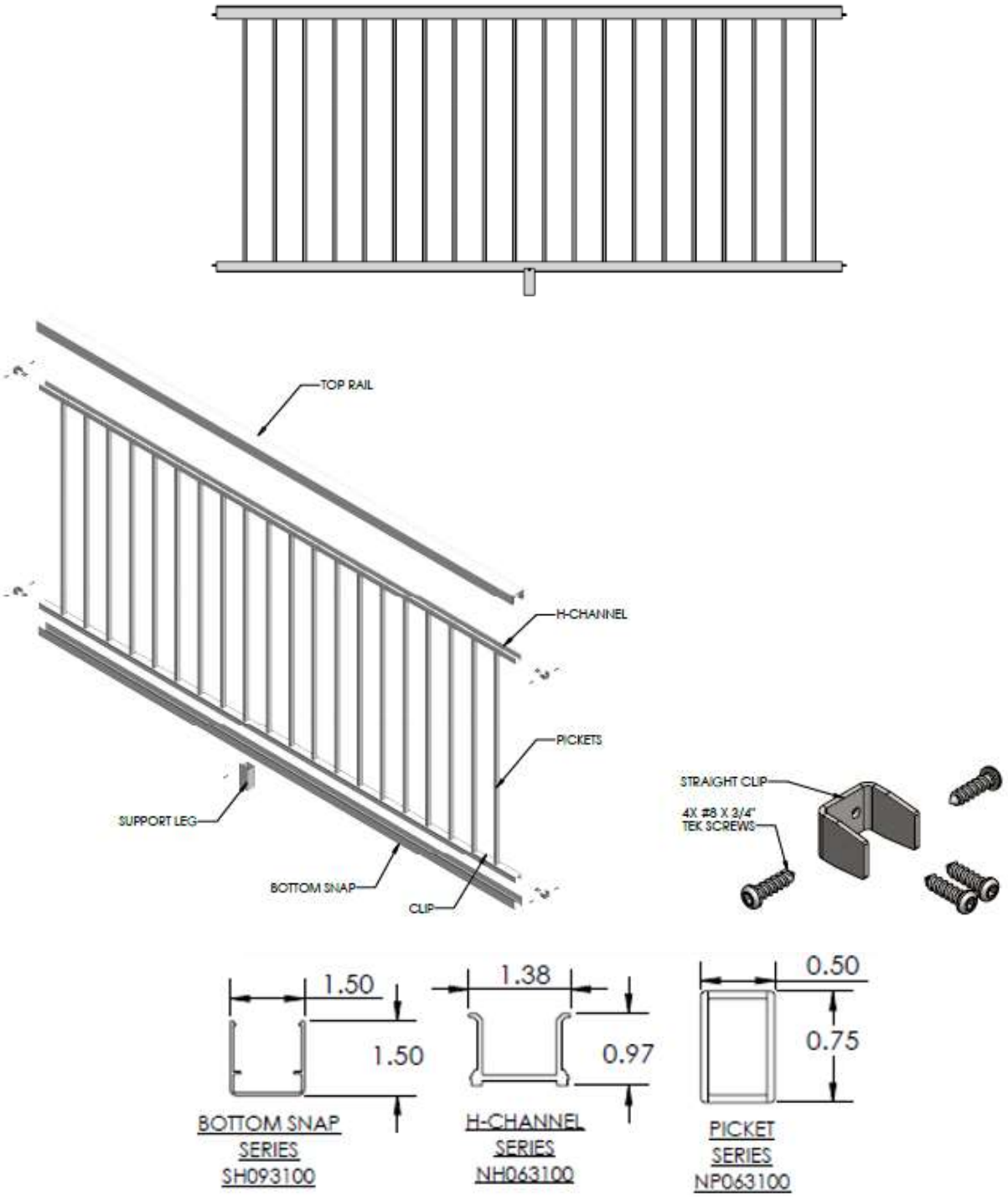
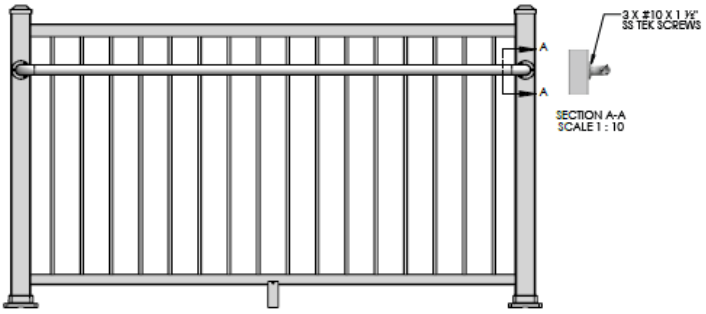
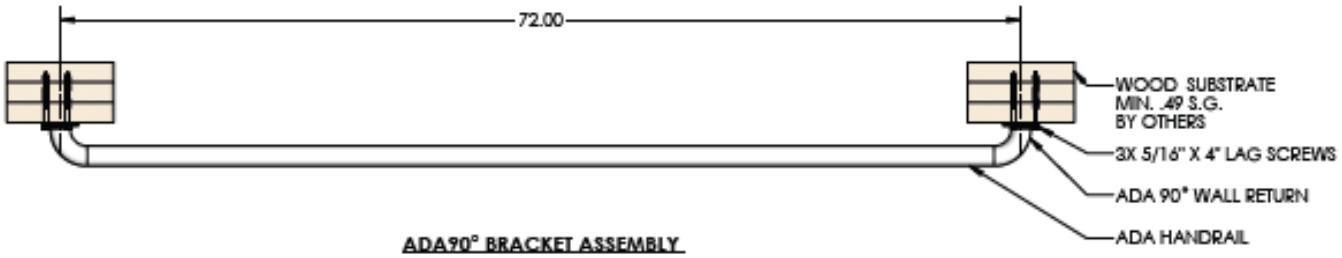
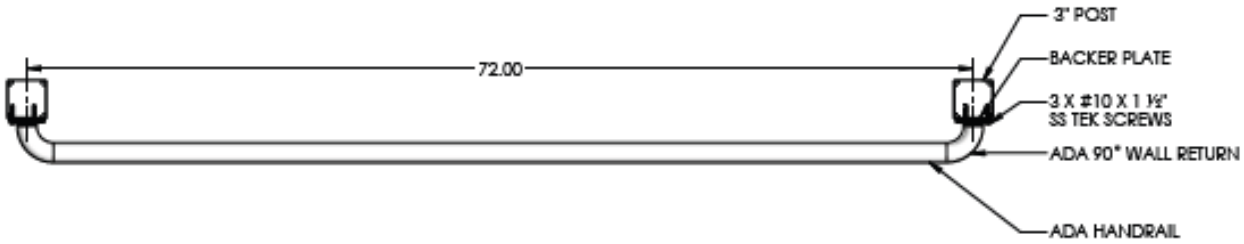


FIGURE 1—TYPICAL IRX ALUMINUM GUARDRAIL ASSEMBLY AND COMPONENT PROFILES

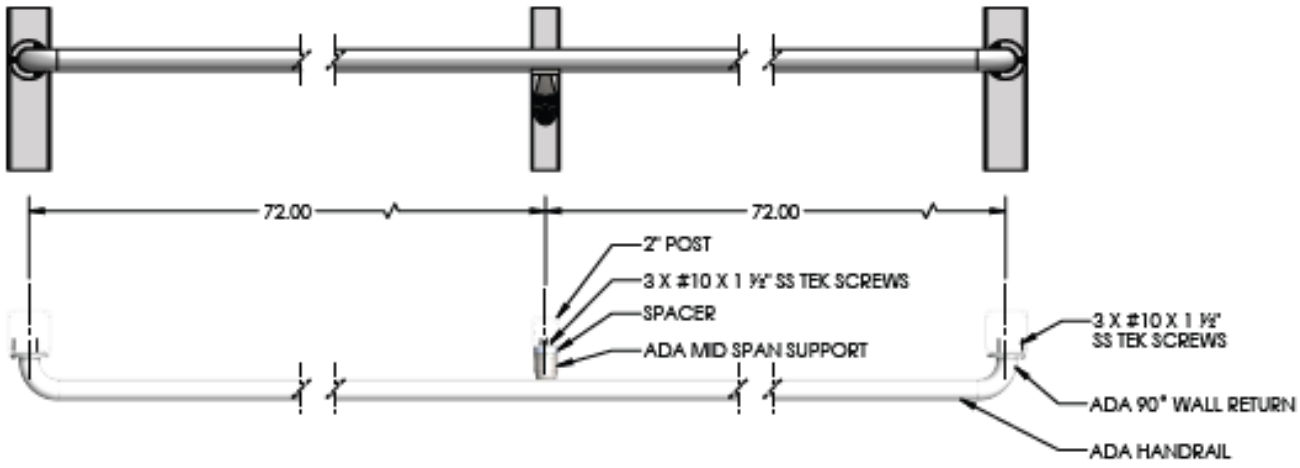




ADA90° BRACKET ASSEMBLY
ATTACHED TO WOOD SUBSTRATE



ADA90° BRACKET ASSEMBLY
ATTACHED TO 3" POST WITH BACKER PLATE



ADA MIDSPAN BRACKET ASSEMBLY
ATTACHED TO 2" ALUMINUM POST

FIGURE 2—TYPICAL ADA HANDRAIL SYSTEM - COMPONENTS

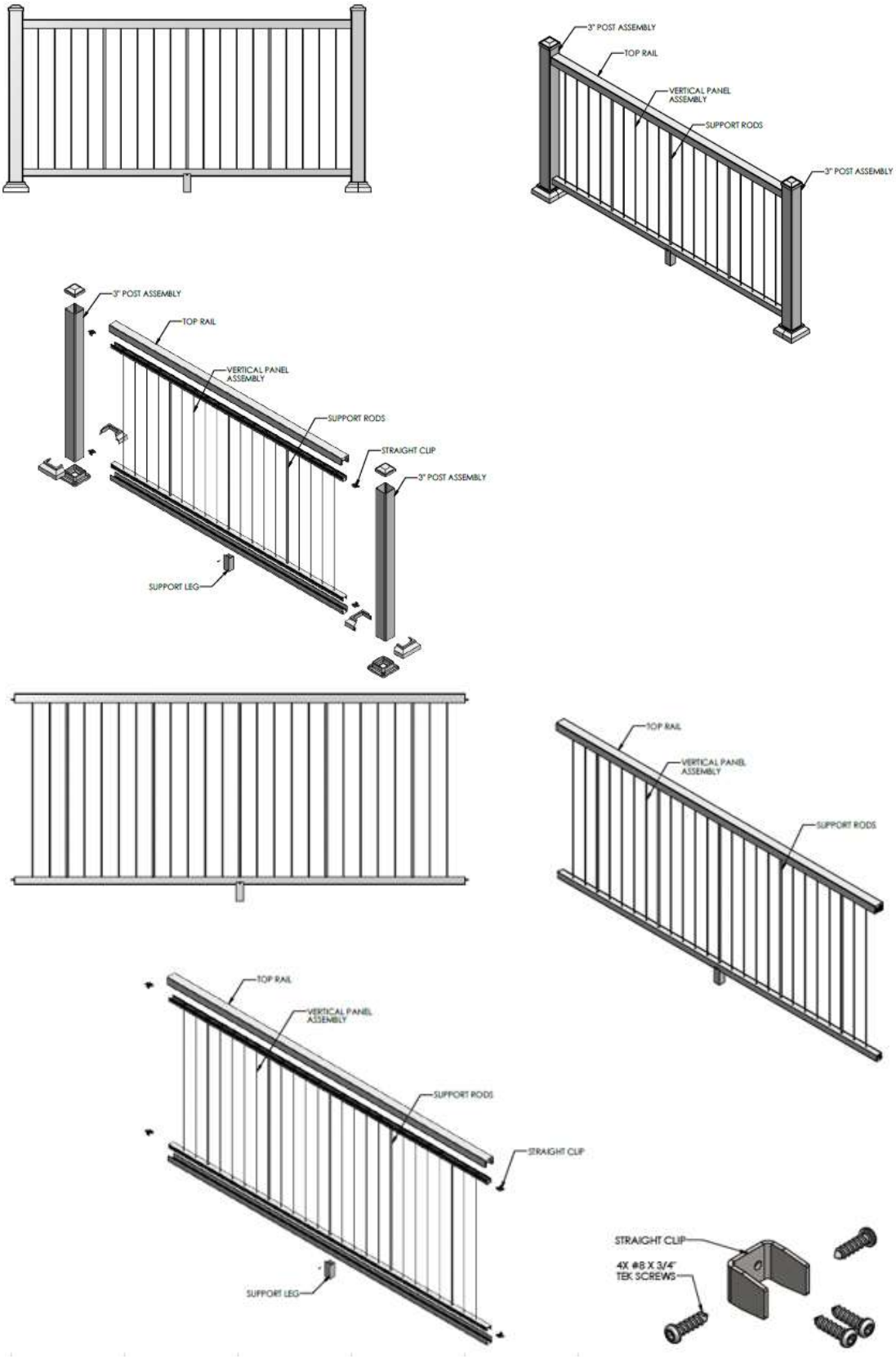


FIGURE 3A—TYPICAL VERTICAL CABLE GUARDRAIL ASSEMBLY AND COMPONENTS (WITH AND WITHOUT POSTS)

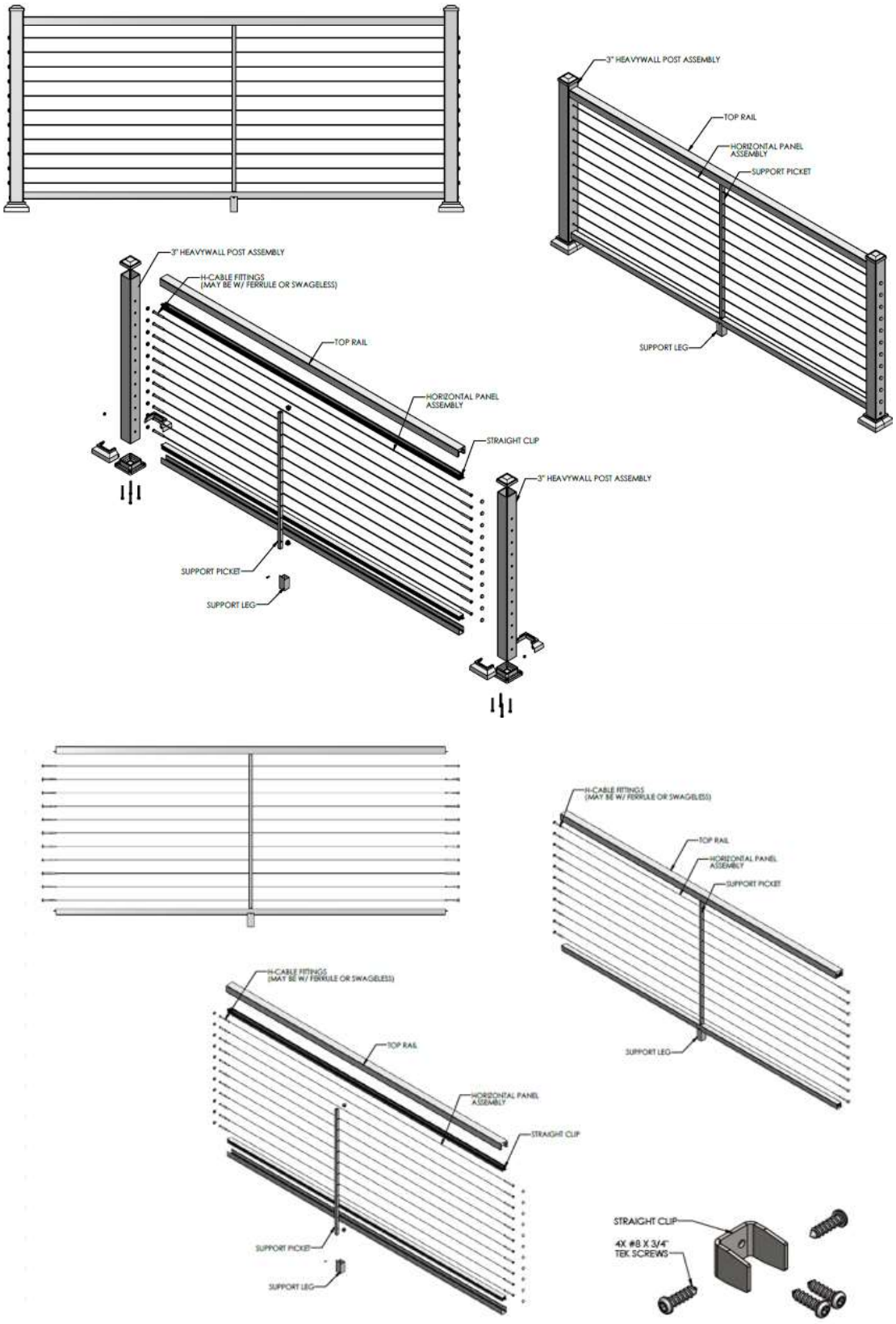
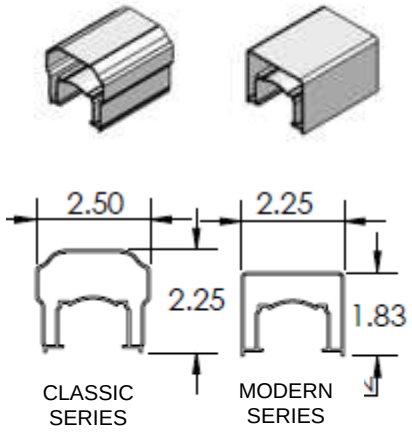
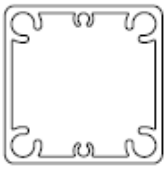
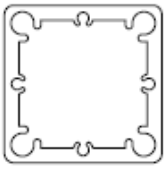
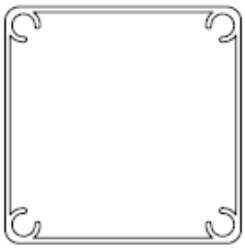


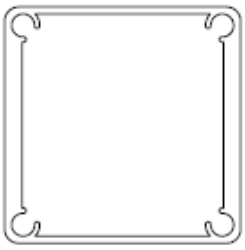
FIGURE 3B—TYPICAL HORIZONTAL CABLE GUARDRAIL ASSEMBLY AND COMPONENTS (WITH AND WITHOUT POSTS)




2" POST


2" HEAVYWALL POST


3" POST


3" HEAVYWALL POST

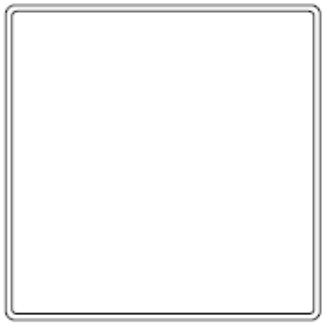

4" POST

FIGURE 4—TOP RAIL AND POST PROFILES

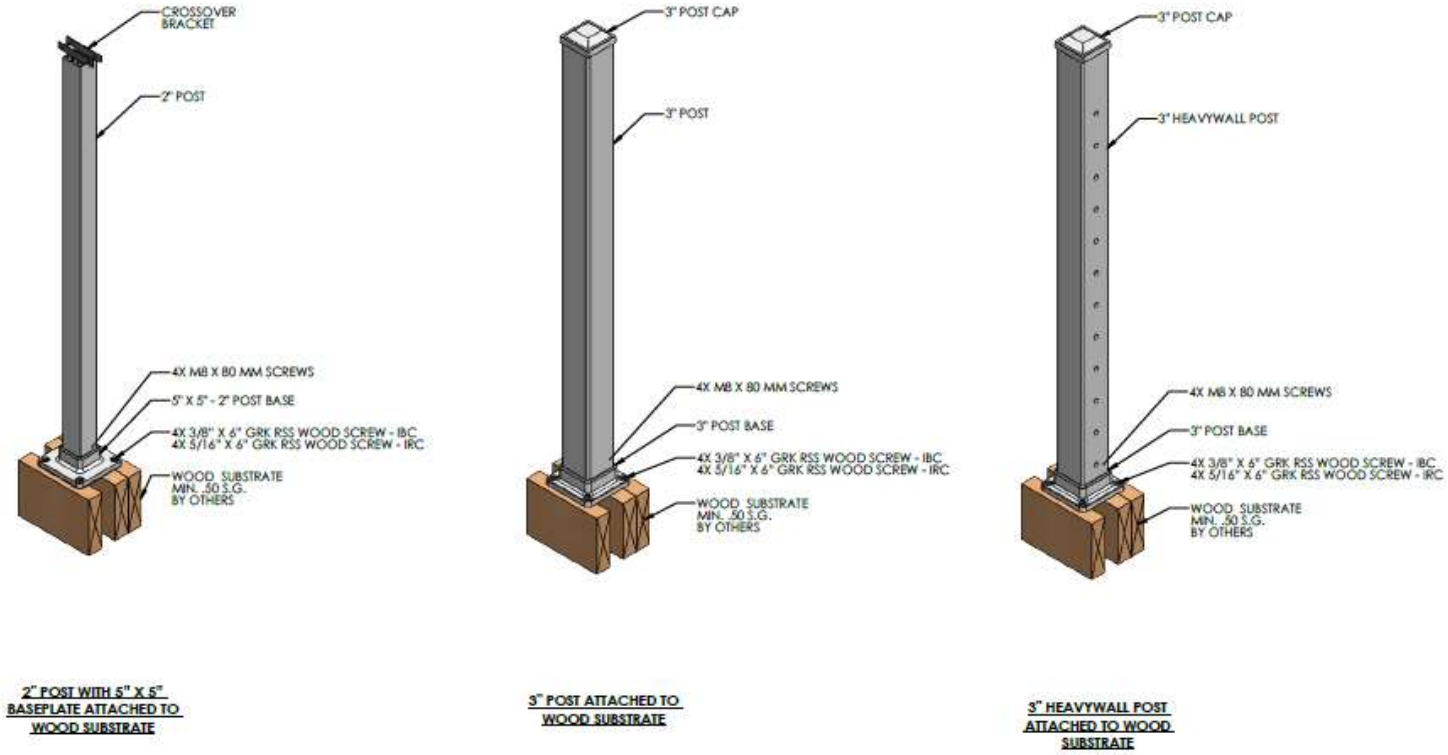


FIGURE 5—2-INCH AND 3-INCH POSTS ATTACHED TO WOOD SUBSTRATE

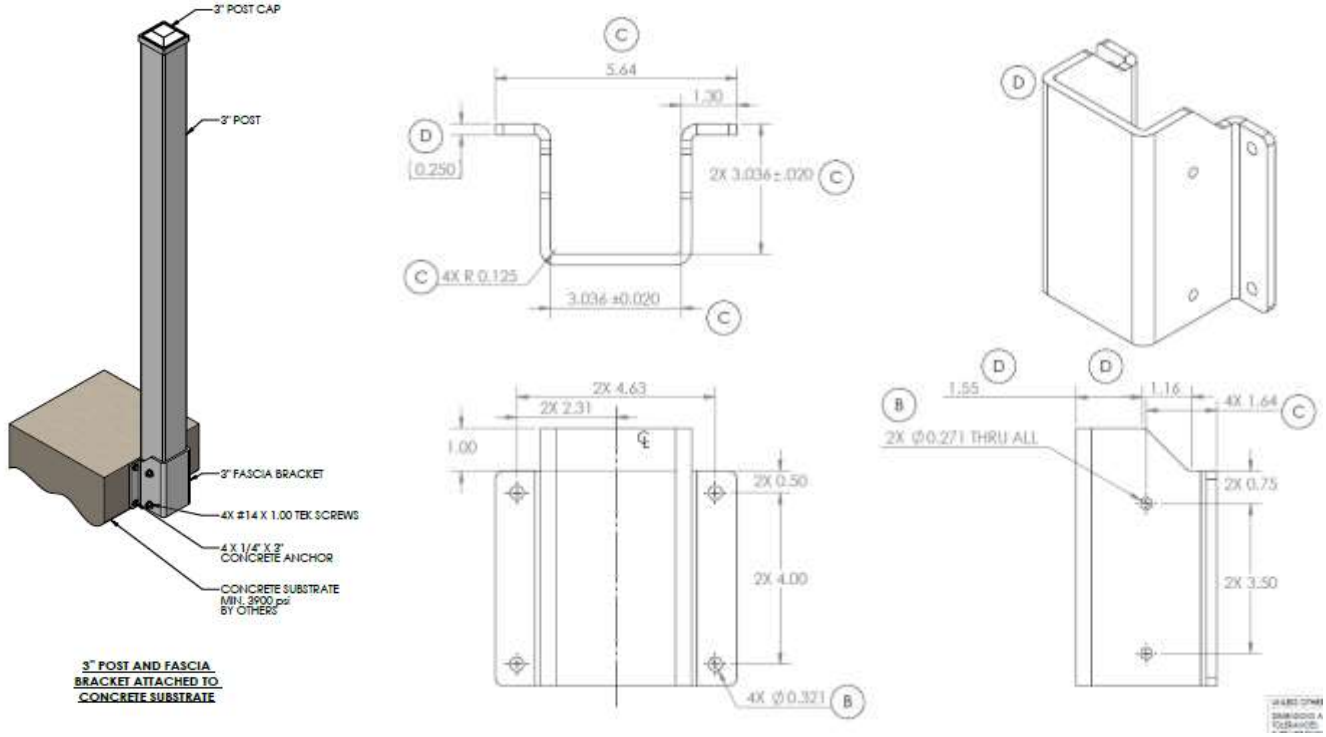


FIGURE 6—FASCIA BRACKET ASSEMBLY FOR 3-INCH POST

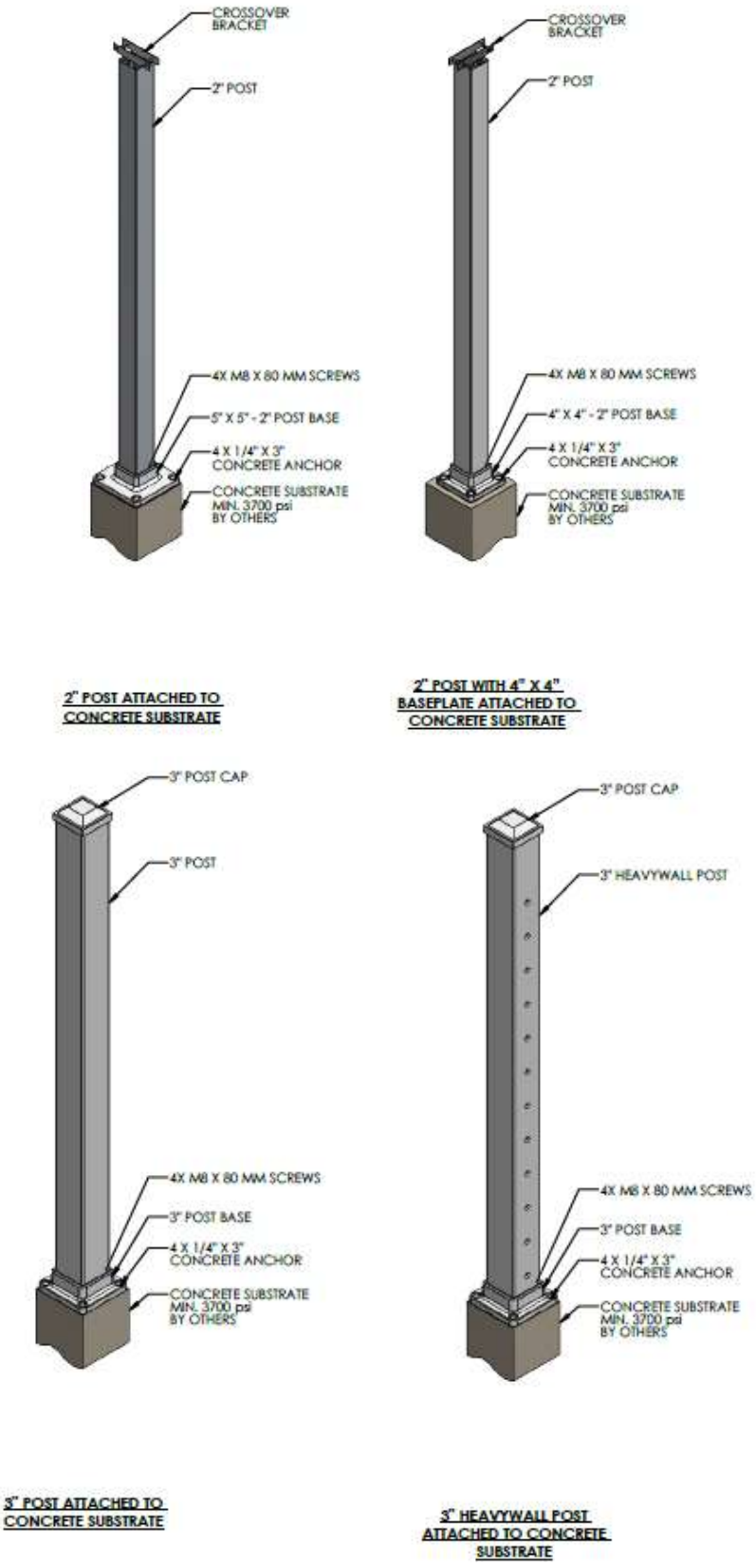


FIGURE 7—2-INCH AND 3-INCH POSTS ATTACHED TO CONCRETE SUBSTRATE

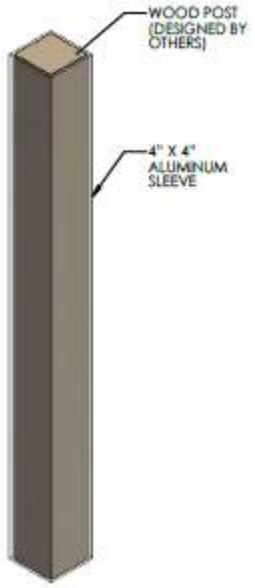


FIGURE 8— 4"x4" ALUMINUM SLEEVE OVER NOMINAL 4X4 WOOD POST

ICC-ES Evaluation Report

ESR-4217 FL Supplement

Reissued September 2024

This report is subject to renewal September 2025.

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DIVISION: 05 00 00—METALS
Section: 05 52 00—Metal Railings

REPORT HOLDER:

AZEK BUILDING PRODUCTS LLC

EVALUATION SUBJECT:

THE IMPRESSION RAIL EXPRESS ALUMINUM RAILING SYSTEM SERIES CLASSIC AND MODERN; VERTICAL CABLE SYSTEM; HORIZONTAL CABLE SYSTEM; AND ADA HANDRAIL SYSTEM

1.0 REPORT PURPOSE AND SCOPE

Purpose:

The purpose of this evaluation report supplement is to indicate that the Impression Rail Express Aluminum Railing System Series Clasic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System, described in ICC-ES evaluation report ESR-4217, have also been evaluated for compliance with the codes noted below.

Applicable code editions:

- 2023 *Florida Building Code—Building*
- 2023 *Florida Building Code—Residential*

2.0 CONCLUSIONS

The Impression Rail Express Aluminum Railing System Series Clasic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System, described in Sections 2.0 through 7.0 of the evaluation report ESR-4217, comply with the *Florida Building Code—Building and Florida Building Code—Residential.* The design requirements must be determined in accordance with the the *Florida Building Code—Building and Florida Building Code—Residential,* as applicable. The installation requirements noted in ICC-ES evaluation report ESR-4217 for the 2021 *International Building Code*® meet the requirements of the the *Florida Building Code—Building and Florida Building Code—Residential,* as applicable.

Use of the Impression Rail Express Aluminum Railing System Series Clasic and Modern; Vertical Cable System; Horizontal Cable System; and ADA Handrail System for compliance with the High-Velocity Hurricane Zone provisions of the *Florida Building Code—Building and Florida Building Code—Residential* has not been evaluated and is outside the scope of this evaluation report.

For products falling under Florida Rule 61G20-3, verification that the report holder's quality-assurance program is audited by a quality-assurance entity approved by the Florida Building Commission for the type of inspections being conducted is the responsibility of an approved validation entity (or the code official, when the report holder does not possess an approval by the Commission).

This supplement expires concurrently with the evaluation report, reissued September 2024.