

Issue Date: 08-30-2018
Revised Date: 08-16-2024
Renewal Date: 08-31-2025

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

REPORT HOLDER:

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REPORT SUBJECT:

Ultra Aluminum Inc. Guardrail Systems

- *Ultra Max Adams* Railing System
- *Signature Adams* Railing System
- *Juliette Balcony*
- *Franklin Continuous* Railing System

Fence and Deck Supply Guardrail Systems

- *Optimum* Aluminum Railing

1.0 SCOPE OF EVALUATION

1.1 This Research Report addresses compliance with the following Codes:

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

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

1.2 Ultra Aluminum railing systems have been evaluated for the following properties:

- Structural Performance

1.3 Ultra Aluminum railing systems have been evaluated for the following uses (see Table 1):

- The Ultra Aluminum railing systems are railings under the definitions of the referenced codes. It is intended for use at or near the open sides of elevated walking areas of buildings and walkways as required by the codes.
- Railings are provided as level railings for level walking areas such as decks, balconies, and porches.

2.0 STATEMENT OF COMPLIANCE

The Ultra Aluminum railing systems 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 The Ultra Aluminum railing systems are an assemblage of extruded aluminum top and bottom rails, balusters, structural aluminum posts, rail to post brackets and decorative moldings and post caps. Railings are provided with rail lengths and installed heights as identified in Table 2.

3.1.1 The top rails consist of extruded aluminum profiles. See Figure 1.

3.1.1.1 The *Signature Adams* top rail is an assembly of two extruded aluminum profiles; a cap snap fitted over a support rail, with nominal dimensions of 1-11/16-inch-high by 1-11/16 inch wide.

3.1.1.2 The *Ultra Max Adams* top rail is an extruded aluminum profile with nominal dimensions of 1-11/16-inch-high by 1-11/16 inch wide.

3.1.1.3 The *Juliette Balcony* top rail is an extruded aluminum profile with nominal dimensions of 1.34 inches high by 2.25 inches wide.



3.1.1.4 The *Franklin Continuous* top rail is an assembly of two extruded aluminum profiles; a cap snap fitted over a support rail, with nominal dimensions of 1-11/16-inch-high by 2-1/4 inch wide.

3.1.2 The bottom rails consist of extruded aluminum profiles. See Figure 2.

3.1.2.1 The *Signature Adams* and *Franklin Continuous* bottom rail assembly consists of two extruded aluminum profiles, a cap snap fitted over a support rail. Overall dimensions of the assembly are 1.32 inches tall and 1.35 inches wide.

3.1.2.2 The *Ultra Max Adams* bottom rail is an extruded aluminum profile with nominal dimensions of 1.32 inches tall by 1.35 inches wide.

3.1.2.3 The *Juliette Balcony* bottom rail is an extruded aluminum profile with nominal dimensions of 1.34 inches high by 2.25 inches wide.

3.1.3 The *Ultra Max* and *Signature Adams* top and bottom rails are attached to 2 inch, 2-1/2 inch and 3-inch aluminum posts with cast aluminum collar brackets. The *Franklin Continuous Rail* is attached to 3-inch aluminum posts and 2-inch aluminum intermediate posts with cast aluminum collar brackets. See Figure 4.

3.1.3.1 The 2-inch square posts are extruded aluminum tube, with a nominal wall thickness of 0.125 inches and four raceway channels running the length of the post. The tube is permanently attached to a 4-inch square, 1/2-inch-thick aluminum base plate via both a 1/4-inch continuous fillet weld and four 1/4-20 by 1-inch-long, trim head, Type F thread cutting, stainless steel screws. See Figure 6.

3.1.3.2 The 2-1/2-inch square posts are extruded aluminum tube, with a nominal wall thickness of 0.10 inches and four raceway channels running the length of the post. The tube is permanently attached to a 5-inch square, 3/8-inch-thick aluminum base plate via both a 1/4-inch continuous fillet weld and four 1/4-20 by 1-inch-long, trim head, Type F thread cutting, stainless steel screws. See Figure 7.

3.1.3.3 The 3-inch square posts are extruded aluminum tube, with nominal wall thickness of 0.125 inches and six

or four raceway channels running the length of the post. The six-raceway tube is permanently attached to a 5-inch square, 1/2-inch-thick aluminum base plate via both a 3/8-inch continuous fillet weld and six 1/4-20 by 2-inch-long, trim head, Type F thread cutting, stainless steel screws. The four-raceway tube is permanently attached to a 5-inch square, 3/8-inch-thick aluminum base plate via both a 3/8-inch continuous fillet weld and four 1/4-20 by 1-inch-long, trim head, Type F thread cutting, stainless steel screws. See Figures 8 and 9.

3.1.4 The *Juliette Balcony* rail assembly is attached to the primary structure via a prefabricated corner bracket assembly. The corner bracket assembly consists of two balusters, top and bottom rail corners, corner gussets, and 4-inch square aluminum plates. The rail corner are two permanently welded rails via a 1/4-inch continuous fillet weld at the corner joint. A corner gusset is permanently welded to the inside corner of the rail with 1/4-inch fillet welds 1 inch in length on the top edge, and of the gusset, and 1-1/2 inch in length on the bottom edge at each location where the gusset meets the rail. At the end of the rail where it meets the rail plate, the components are permanently welded via a 1/4 inch continuous fillet weld. See Figure 5.

3.1.5 Infill consists of 0.75-inch square, hollow, extruded aluminum balusters, with nominal wall thickness of 0.05 inches.

3.1.5.1 *Ultra Max Adams*, *Signature Adams*, and *Franklin Continuous Rail* balusters are secured to top rails with high-density-polyethylene baluster plugs. Balusters are inserted into routed holes in the bottom rails. See Figure 3.

3.1.5.2 *Juliette Balcony* balusters are secured to top and bottom rails by a 1/4-inch fillet weld, 3/4 inches in length on two sides. See Figure 3.

4.0 PERFORMANCE CHARACTERISTICS

4.1 The railing system described in this report has 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 AC273.



5.0 INSTALLATION

5.1 Ultra Aluminum railing systems 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 jobsite during installation.

5.2 The *Ultra Max Adams, Signature Adams, and Franklin Continuous Rail* top and bottom rails are attached directly to structural posts utilizing cast aluminum mounting brackets via mechanical fasteners. See Table 3 for the fastening schedule. Infill aluminum balusters are inserted onto 0.66-inch diameter HDPE plugs. See Figure 5 for the *Juliette Balcony*, the balusters are permanently secured to the top and bottom rails by a 1/4 inch fillet weld, 3/4 inches long on two sides of the baluster that are perpendicular to the length of the railing.

5.3 The *Juliette Balcony* top and bottom rails are attached directly to structural posts utilizing a prefabricated corner bracket assembly. See Tables 3 thru 5 for the fastening schedule and Figure 10. See Section 6.3 for conditions of use.

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

6.3 Anchorage of the *Juliette Balcony* and structural railing posts 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:

6.3.1 A minimum of four anchor bolts must be used and located in the four pre-drilled holes in *Juliette Balcony* brackets and the structural railing post base plate.

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

6.3.3 When the supporting structure is a wood-framed deck or wall, installation must include anchorage to suitable structural framing. Decking and wall sheathing are not considered structural framing, and anchorage to decking or sheathing alone is not an approved installation method.

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

6.5 Where aluminum is in contact with dissimilar materials, direct contact between the aluminum and the other material shall be prevented by factory finish or a heavy coat of alkali-resistant bituminous paint or other coating providing the equivalent protection before installation.

6.6 Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is outside the scope of this report.

6.7 The Ultra Aluminum railing 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 Ultra Aluminum Inc.

7.2 Data demonstrating compliance with the performance requirements of ICC-ES AC273, Acceptance Criteria for Handrails and Guards, revised March 2016 with additional testing including increased test loads to address IBC.

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



7.4 Intertek Listing Report "[Ultra Aluminum Manufacturing Inc.](#)", on the [Intertek Directory of Building Products](#).

8.0 IDENTIFICATION

The Ultra Aluminum railing systems that are described in this report shall be identified with labeling bearing the report holder's name (Ultra Aluminum Manufacturing, Inc.), the Intertek mark, the Intertek Control Number, the Code Compliance Research Report number (CCRR-0278), and the following statement: "See CCRR-0278 at <https://bpdirectory.intertek.com> for uses and performance levels."



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 <https://bpdirectory.intertek.com> is recommended to ascertain the current version and status of this report.

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TABLE 1 – PROPERTIES EVALUATED

PROPERTY	2015 IBC SECTION	2015 IRC SECTION
Structural Performance	1607.8	R301.5

TABLE 2 – RAILING SYSTEMS AND USE CATEGORIES

Aluminum Railing System	Railing Type	Maximum Railing Dimensions	Support Post Mount System	Code Occupancy Classification
<i>Ultra Max</i> <i>Adams</i> <i>Optimum</i> <i>Signature Adams</i>	Level	61-7/16 inches by 42 inches ⁽¹⁾	2-inch post	IBC IRC
		62-1/2 inches by 42 inches ⁽¹⁾	2-1/2-inch post	
		80-1/2 inches by 42 inches ⁽¹⁾	3-inch post (four screw bosses)	
		97-1/4 inches by 42 inches ⁽¹⁾	3-inch post (six screw bosses) ⁽³⁾	
		97-1/4 inches by 36 inches ⁽¹⁾	2-inch post	The use of this product shall be limited to exterior use as a railing system for balconies and porches for one- and two-family dwellings (IBC) or construction in accordance with the IRC.
			2-1/2-inch post	
			3-inch post (four screw bosses)	
<i>Franklin</i> <i>Continuous Rail</i>	Level	59-1/2 inches by 42 inches ⁽⁵⁾	Outside Post: 3-inch post (six screw bosses) ⁽³⁾ Intermediate Post: 2-inch post	IBC IRC
<i>Juliette Balcony</i>	Level	128 inches by 42 inches ⁽²⁾	Primary structure ⁽⁴⁾	IBC IRC

¹ Railings are qualified up to and including the listed maximum railing system dimensions for use in the referenced Code Occupancy Classification. Railing length is actual railing length, i.e. clear space between supports for level rails. Railing height is walking surface to top of top rail.

² Juliette Balcony is qualified up to and including the listed maximum railing system dimensions for use in the referenced Code Occupancy Classification. Railing length is measured from the outside edge of each of the corner rails.

³ The 3-inch post with the six screw bosses may be installed in either orientation where the two sets of three screw bosses are perpendicular or parallel to the span of the railing.



⁴ The top and bottom rails of the Juliette Balcony are attached directly to the primary structure. Anchorage of the top and bottom rails 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. See Section 6.3.

⁵ Franklin Continuous Rail length is measured from the inside of outside post to inside of intermediate post.

TABLE 3 – ULTRA MAX ADAMS, OPTIMUM, AND SIGNATURE ADAMS FASTENER SCHEDULE

Connection	Fastener ¹
Rail Bracket to Post	Two 1/4-14 x 1 inch (0.185 in minor diameter) flat-head, self-drilling, stainless steel screws
Rail Bracket to Rail	One 1/4-14 x 1 inch (0.185 in minor diameter) flat-head, self-drilling, stainless steel screws
HDPE Baluster Plug to Top Rail	One 3/16-inch diameter aluminum body with steel mandrel blind rivet
Baluster to Bottom Rail	Slip fit into routed hole
Support Block Baluster Plug to Bottom Rail	One #8-18 x 1-inch (0.117 in minor diameter) pan head, self-drilling, coated steel screw

¹ All self-drilling stainless steel screws are 300 series stainless steel.

TABLE 4 – JULIETTE BALCONY FASTENER SCHEDULE

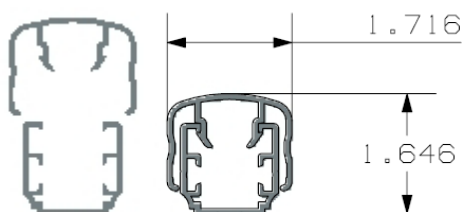
Connection	Fastener ¹
Top Rail to Corner Bracket Assembly	One 1/4-13 x 1 inch (0.184 in minor diameter) trim head, self-drilling, stainless steel screw
Bottom Rail to Corner Bracket Assembly	One 1/4-13 x 1 inch (0.184 in minor diameter) trim head, self-drilling, stainless steel screw
Picket to Top/Bottom Rail	1/4-inch fillet weld, 3/4 inches in length on two sides

¹ All self-drilling stainless steel screws are 300 series stainless steel.

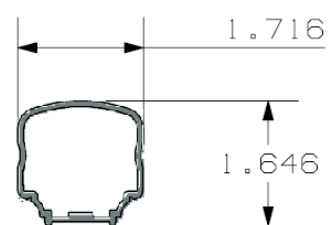
TABLE 5 – FRANKLIN CONTINUOUS RAIL FASTENER SCHEDULE

Connection		Fastener ¹
Top Rail Bracket	To end post	Two 1/4-14 by 1 in (0.184 in minor diameter) trim-head, self-drilling, stainless steel screws
	To intermediate post	Four 1/4-14 by 1 in (0.184 in minor diameter) trim-head, self-drilling, stainless steel screws
	Compression Plate at End Post	One 1/4-14 by 1-1/2 in (0.182 in minor diameter) hex-washer head, self-drilling, coated steel screw
	Compression Plate at Intermediate Post	Two 1/4-14 by 1 in (0.184 in minor diameter) trim-head, self-drilling, stainless steel screws to each of two compression plates
Bottom Rail Bracket	To rail	One 1/4-14 by 1 in (0.184 in minor diameter) trim-head, self-drilling, stainless steel screw located on protected side of rail
	To post	Two 1/4-14 by 1 in (0.184 in minor diameter) trim-head, self-drilling, stainless steel screws
Baluster	To lower section of top rail	One, #8-18 by 1 in (0.118 in minor diameter) pan-head, self-drilling coated steel screw
	To lower section of bottom rail	One, #8-18 by 5/8 in (0.118 in minor diameter) pan-head, self-drilling, coated steel screw

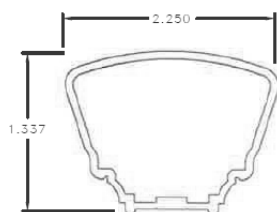
¹ All self-drilling stainless steel screws are 300 series stainless steel.



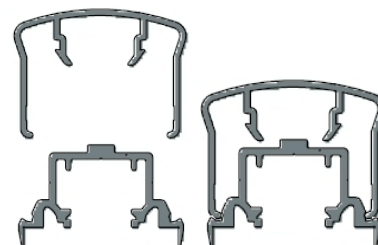
Signature Adams



Ultra Max Adams and Optimum

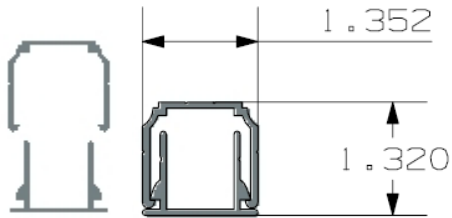


Juliette

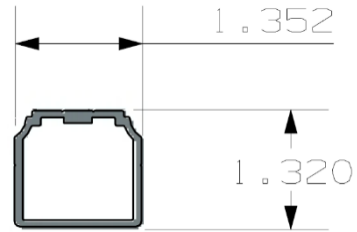


Franklin Continuous Rail

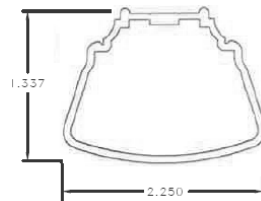
Figure 1 – Top Rail Profiles



Signature Adams and Franklin Continuous



Ultra Max Adams and Optimum



Juliette

Figure 2 – Bottom Rail Profiles

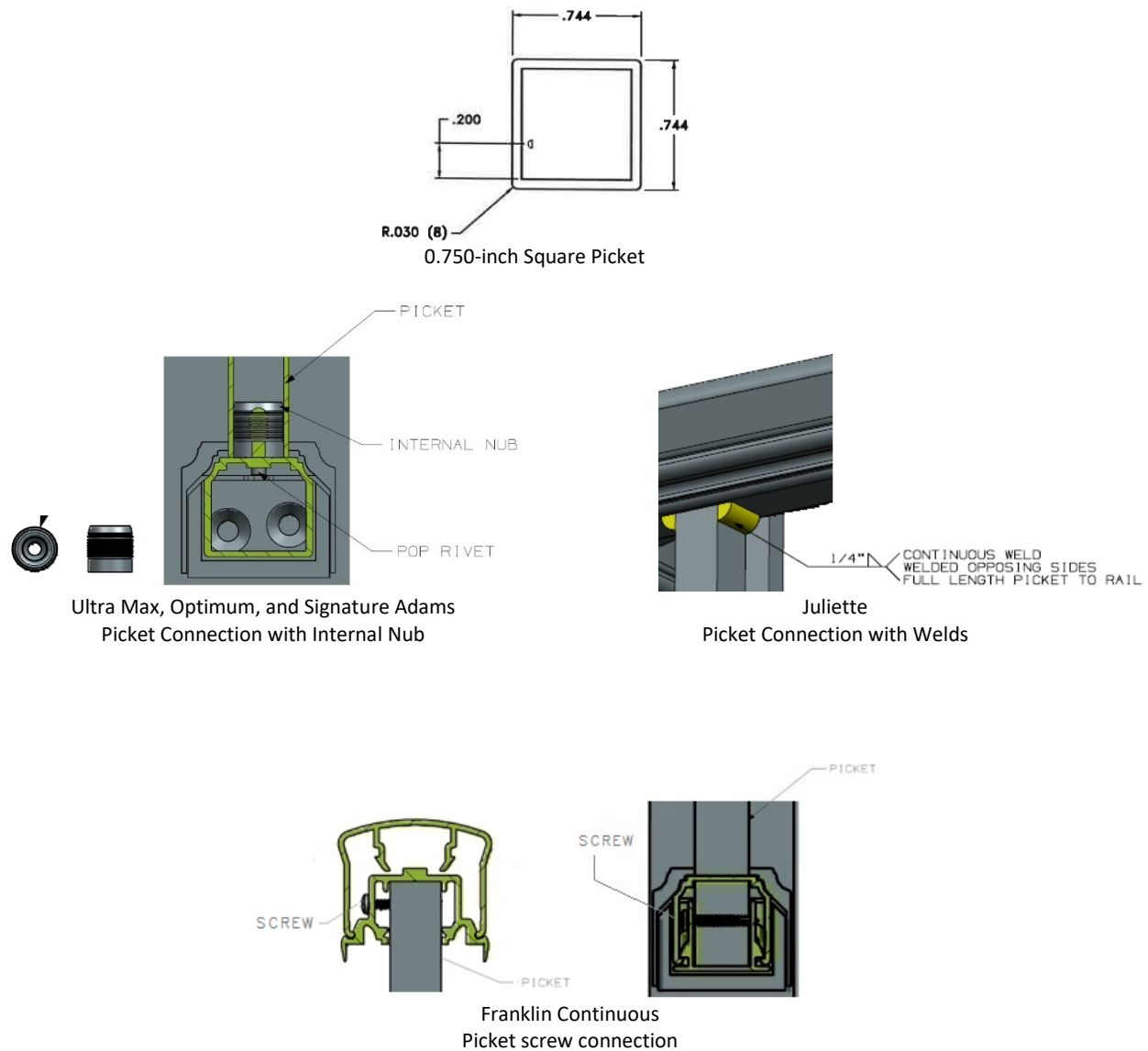
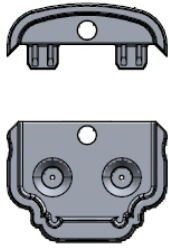
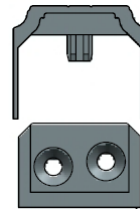
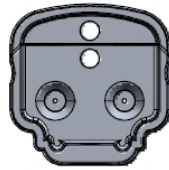


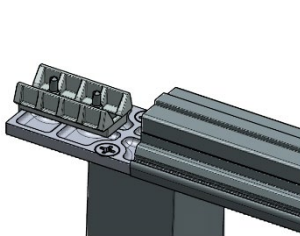
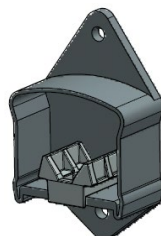
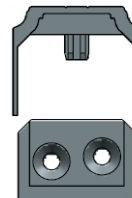
Figure 3 – Infill



Top Rail Bracket



Bottom Rail Bracket

Ultra Max, Optimum, and Signature Adams BracketsContinuous
Top Rail BracketEnd
Top Rail Bracket

Bottom Rail Bracket

Franklin Continuous Rail Brackets**Figure 4 – Railing Brackets**

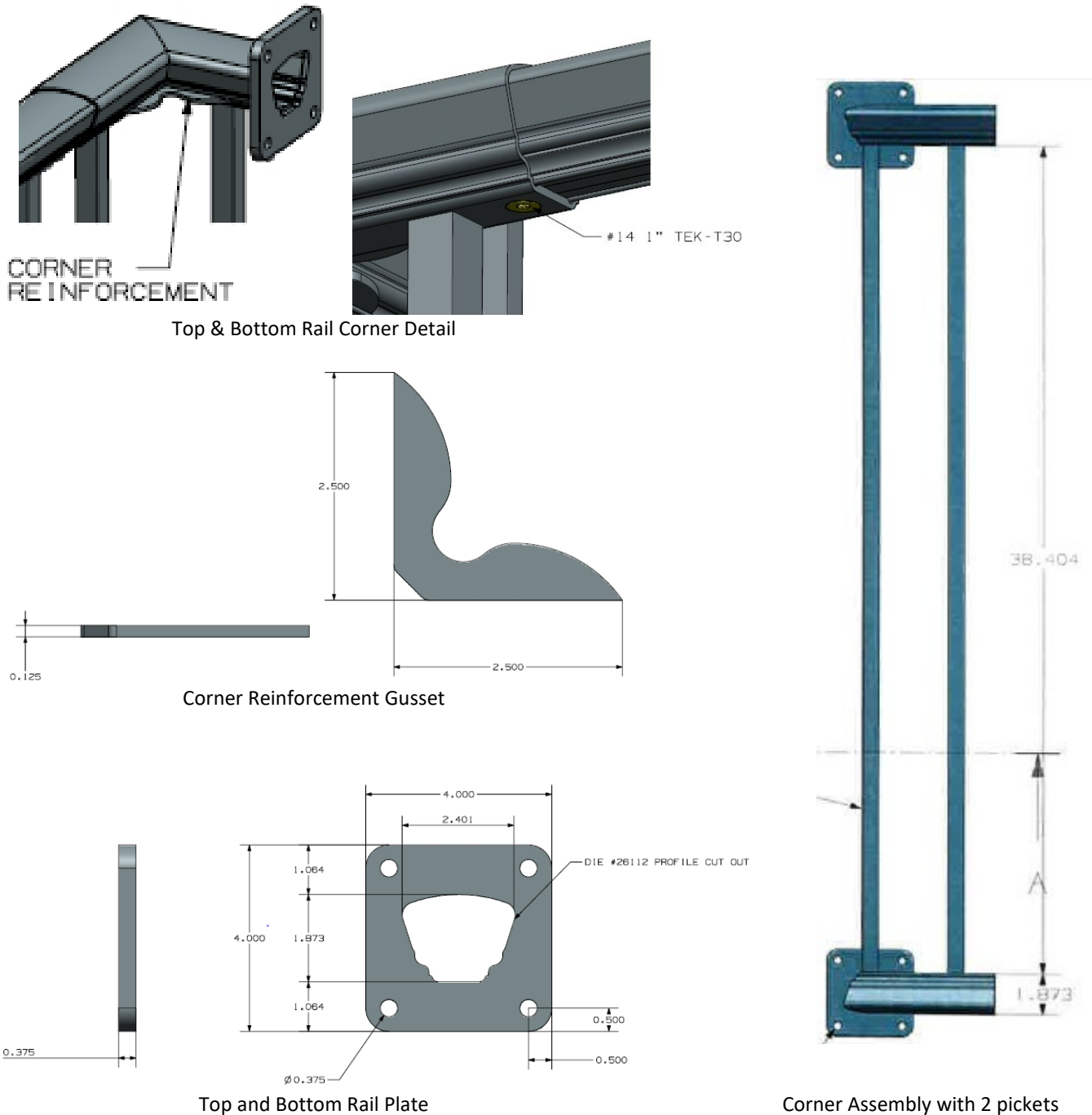


Figure 5 – Juliette Balcony Corner Bracket Assembly

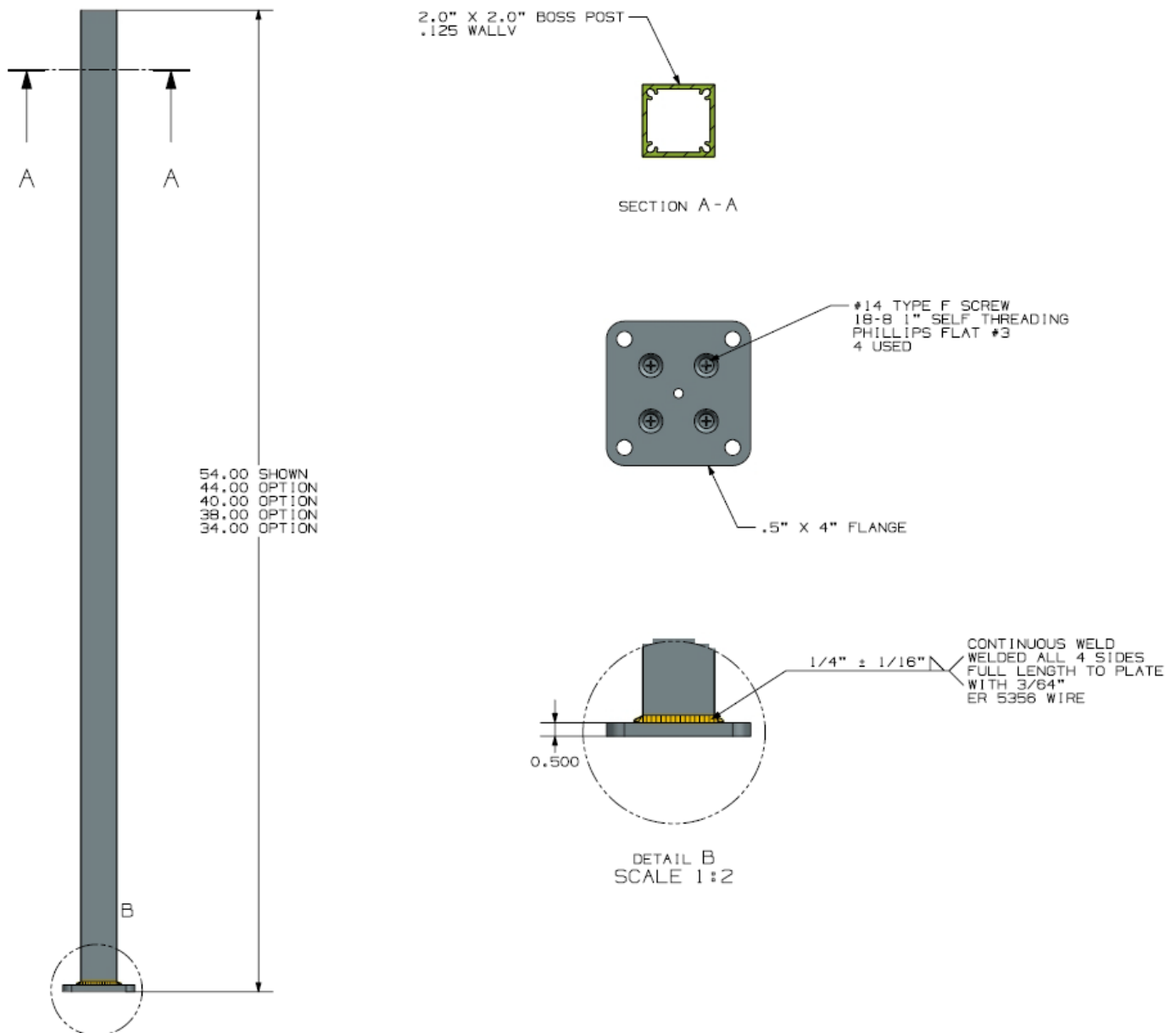


Figure 6 – 2 Inch Aluminum Post

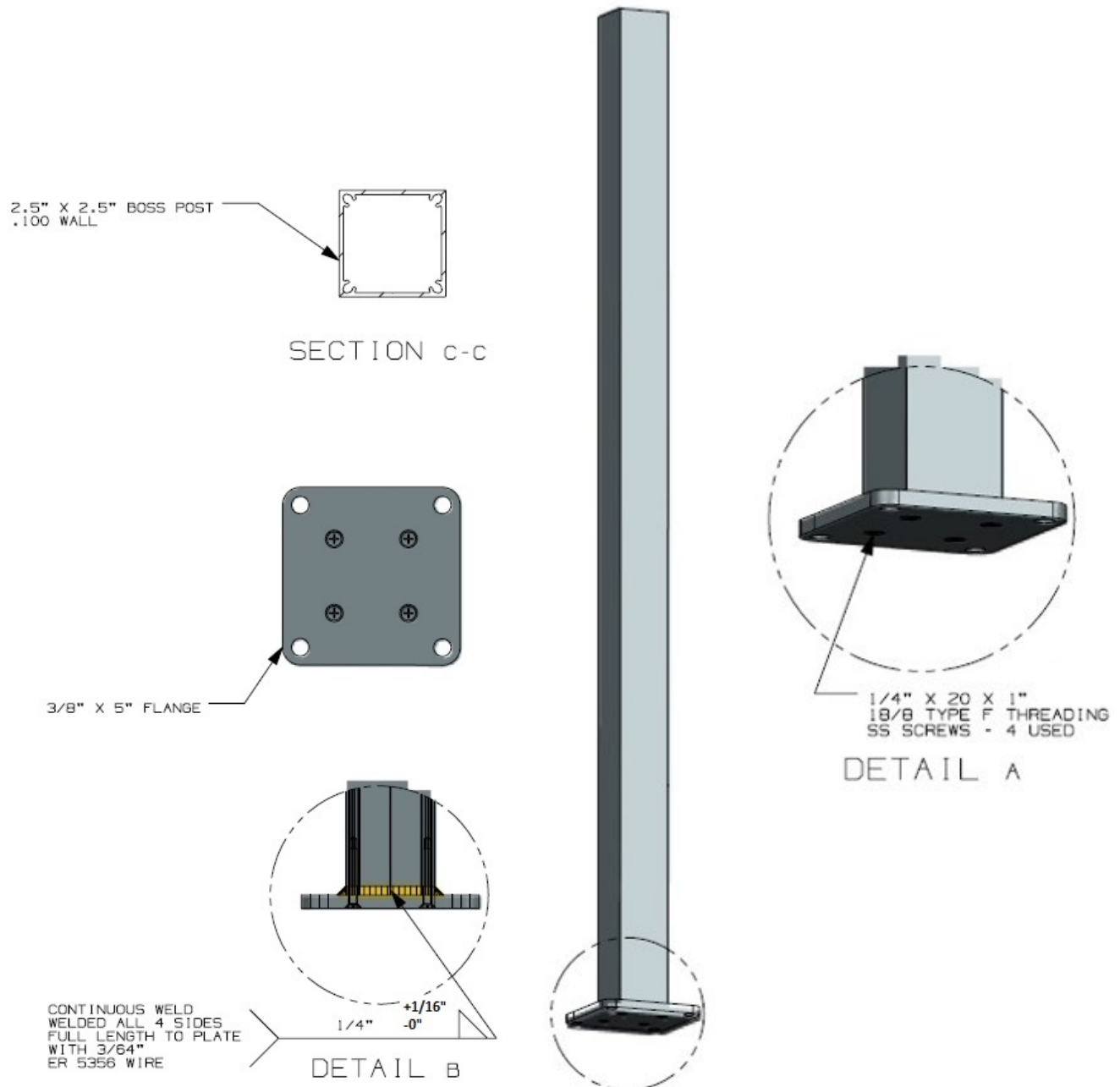


Figure 7 – 2-1/2 Inch Aluminum Post

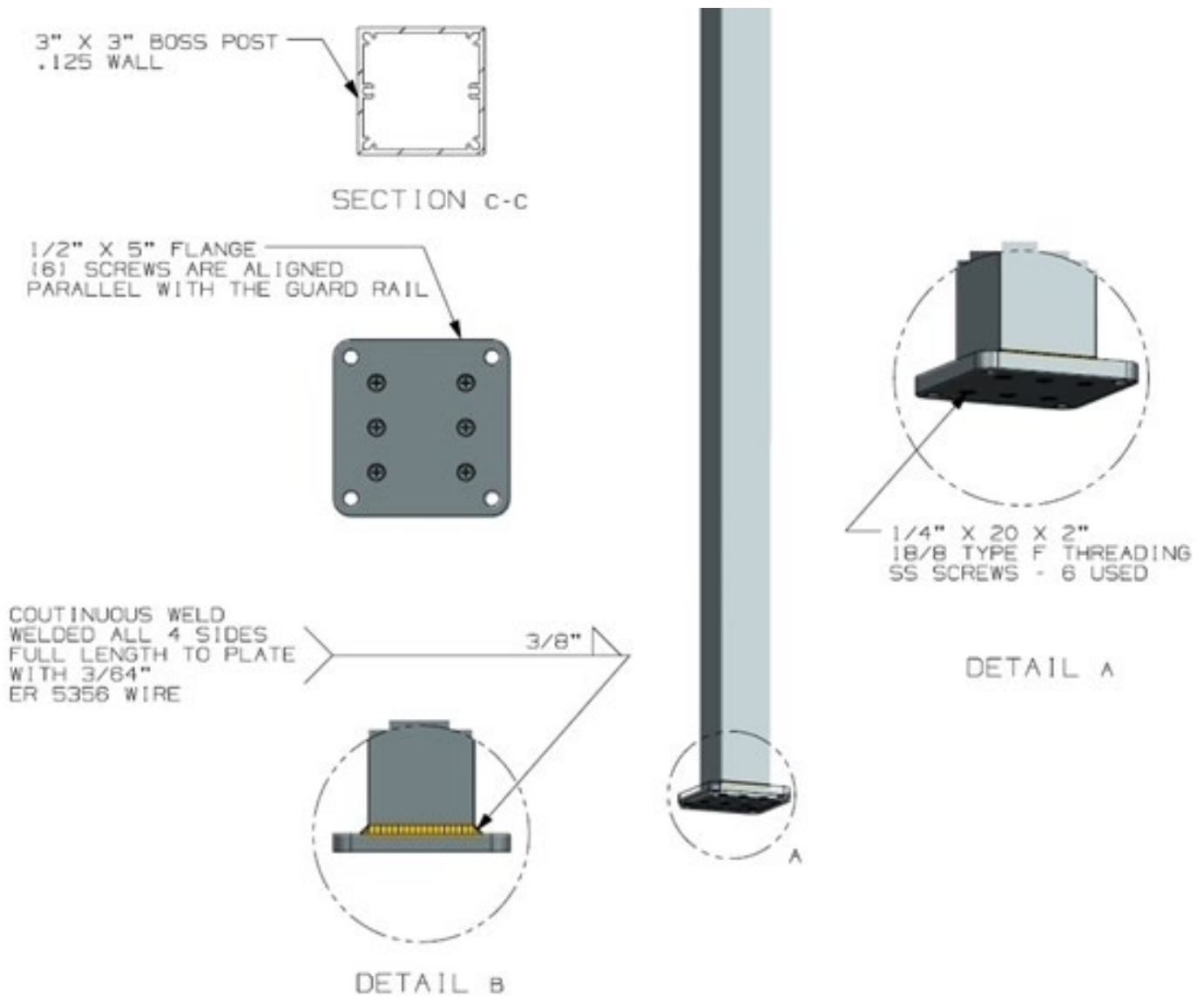


Figure 8 – 3 Inch Aluminum Post (six screw boss)

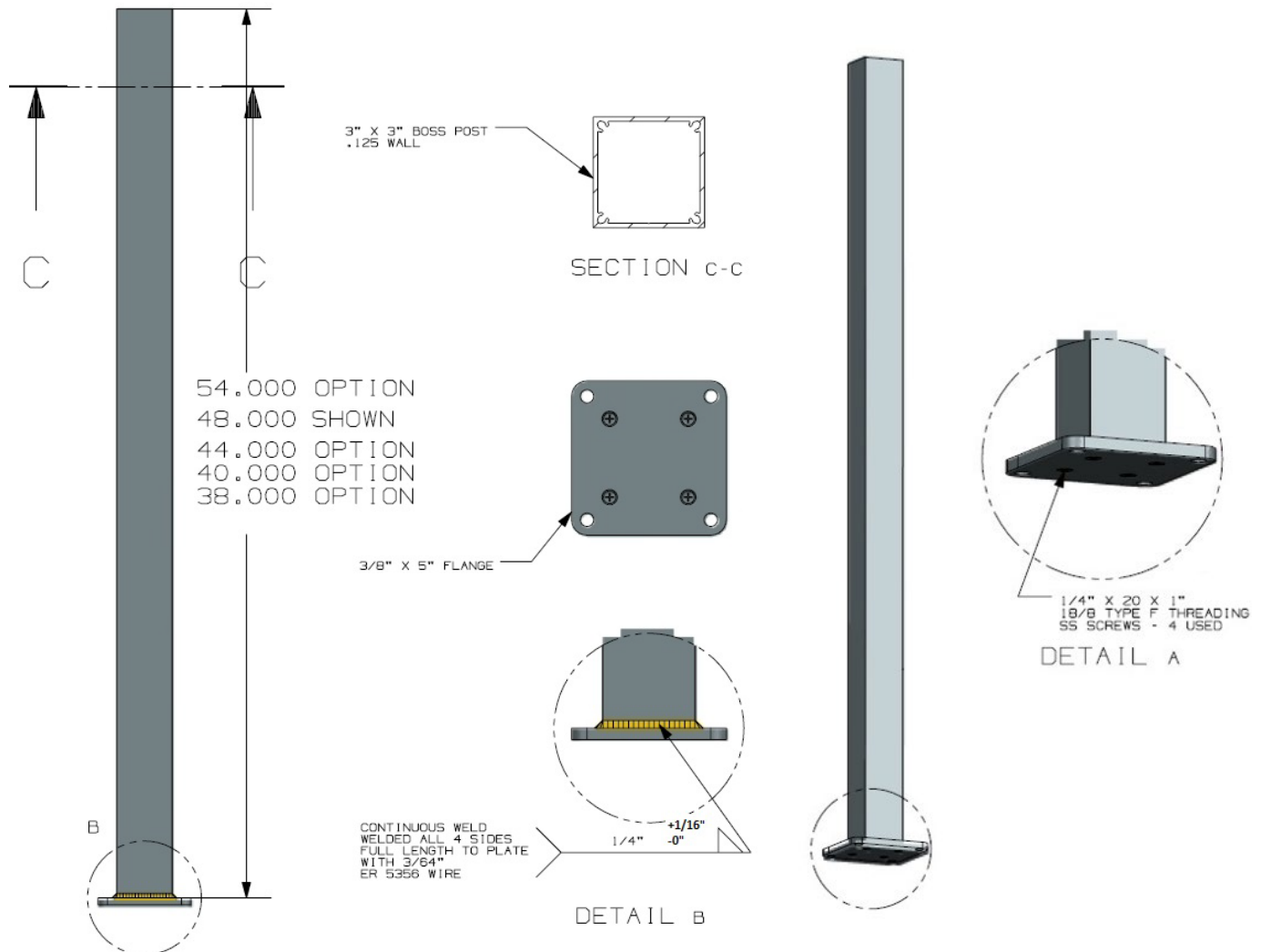


Figure 9 – 3 Inch Aluminum Post (four screw boss)

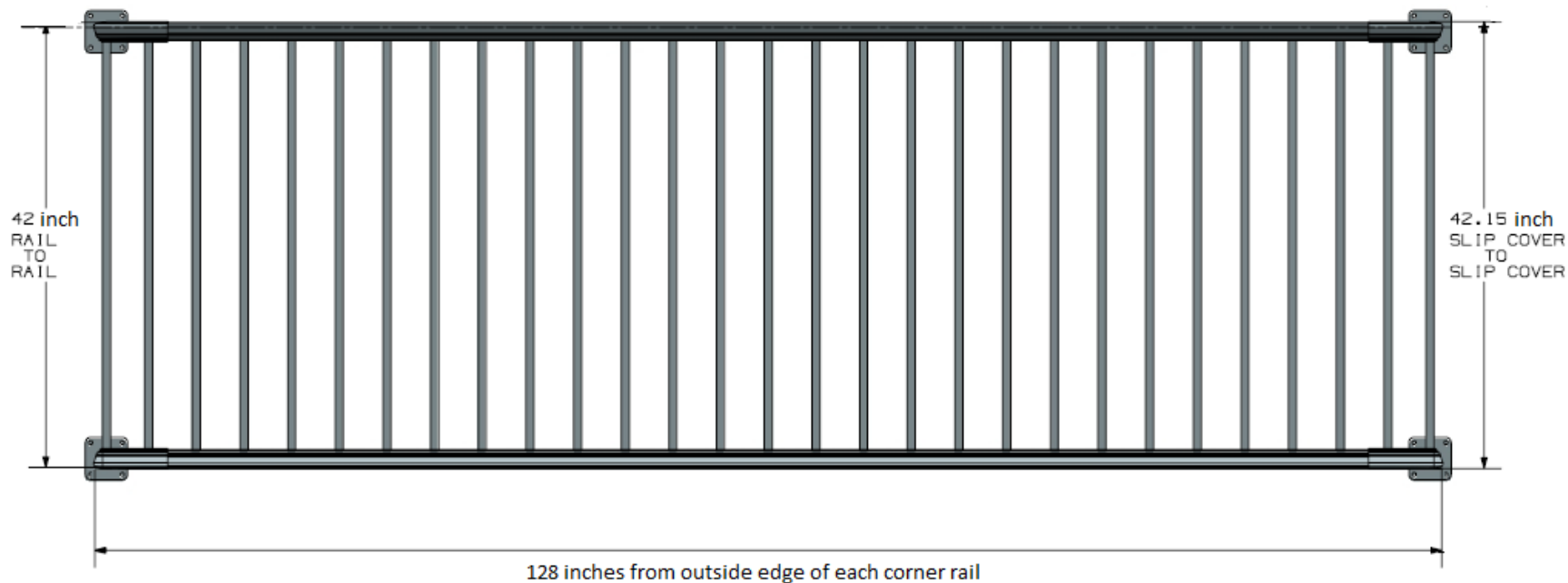


Figure 10 – Juliette Balcony Assembly



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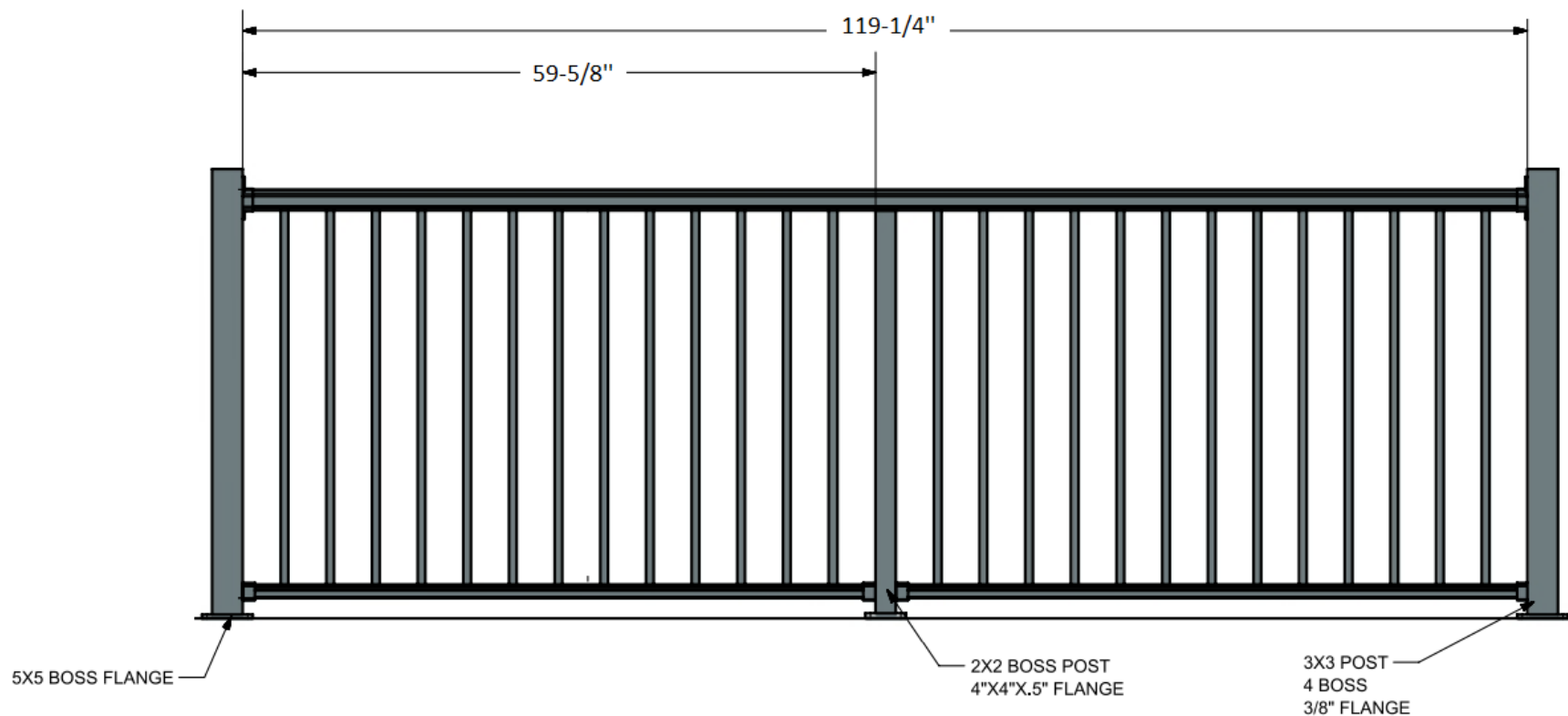


Figure 11 – Franklin Continuous Rail Assembly