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DIVISION: 05 50 00 - Metal Fabrications
Section: 05 52 00 - Metal Railings

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REPORT SUBJECT:

Ultra Aluminum Inc. Guardrail Systems
Ultra Rail and Ultra Advantage™ Guardrails

- Franklin Profile
- Jefferson Profile
- Deck-Over™ Aluminum Railing

Absolute Distribution Inc.
DekPro Prestige™ Aluminum Railings

- Franklin Profile

USA Vinyl, LLC
Ultra Advantage™ Jefferson Guardrails

- Fairlawn, Eden, Bromley, Classic Square Balusters
- Amherst, Sutton, Bedford, Classic Round Balusters

Shoreline Vinyl Systems Inc.
Coastal Aluminum Rail By Shoreline

- Jefferson Profile

L.B Plastics, Inc.
1200 Series Railing System

- Jefferson Profile

1.0 SCOPE OF EVALUATION

1.1. This research report addresses compliance with the following Codes:

- 2015 and 2012 *International Building Code*® (IBC)
- 2015 and 2012 *International Residential Code*® (IRC)
- 2017 *Florida Building Code* (See Section 9) *Including High Velocity Hurricane Zones (HVHZ)*

1.2. Guardrail systems have been evaluated for the following properties:

- Structural Performance

1.3. The *Ultra Rail*, *Ultra Advantage*, *Ultra Deck-Over*, *DekPro Prestige*, *Coastal Aluminum*, and *1200 Series* railing systems have evaluated for the following uses:

- Guards or guardrails 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.
- Guards are provided as level guards for level walking areas such as decks, balconies, and porches.



2.0 STATEMENT OF COMPLIANCE

Aluminum guardrail systems recognized in this report 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. Guard Assemblies - The level guards are provided with rail lengths up to 119-1/2" in length (measured between the inside of support posts) and an installed height of 42 inches. See Table 1 for qualified configurations.

3.2. Materials and Processes - The aluminum guardrail systems recognized in this report are an assemblage of extruded aluminum materials, extruded HDPE rail inserts and connectors, and stainless-steel fasteners. The system is available in various colors and architectural grade powder coated finishes.

3.3. Components - The guardrail system includes a top rail, optional mid rail, bottom rail, vertical balusters, structural aluminum posts, rail-to-post brackets, bottom rail support blocks, decorative moldings and post caps.

3.4. The top, mid and bottom rails are connected to the aluminum posts via cast aluminum saddle brackets. See Table 2 for Fastening Schedule.

3.5. Rails

3.5.1. The *Ultra Rail* top rail system is composed of three pieces. The 6005-T5 aluminum Franklin or Jefferson gripping profile surface interlocks over the 6005-T5 aluminum Ultra Rail routed internal rail section. This internal section is configured to receive the third piece which is a HPDE rail insert with integral connectors that slides inside the Rail A and drops into routed holes for the connection of the balusters. The bottom rail utilizes the same Ultra Rail A profile with an aluminum snap cover which is simply inverted for connection of the balusters. See Figures 1 & 2.

3.5.2. The *Ultra Deck-Over* top rail is composed of three pieces. The 1-5/16 in high by 1-3/8 in wide profile, 6005-T5 routed aluminum extrusion rail with internal longitudinal ribs and 6005-T5 aluminum extrusion top cap and the HDPE rail insert for connection of the balusters. The top rail can be used separately, or a decking board may be attached to the top surface of the aluminum rail for aesthetic purposes. This same profile is inverted and used as the bottom rail for the *Ultra Deck-Over* rail system. See Figures 3 & 4.

3.5.3. The *Ultra Advantage* top un-routed rail is composed of a 6005-T5 Franklin or Jefferson gripping profile. The bottom rail utilizes a one-piece rail profile. See Figures 6 & 7. The *Ultra Advantage* top un-routed Jefferson rail can also be internally reinforced with a 1/8-inch x 2-inch aluminum rail insert that allows this rail to span 10 feet. See Figures 8 & 9.

3.5.4. The *Coastal Aluminum* and *1200 Series* top un-routed rail is composed of a 6005-T5 Jefferson gripping profile. The bottom rail utilizes a one-piece rail profile. See Figures 6 & 7. The *Coastal Aluminum* and *1200 Series* top un-routed Jefferson rail can also be internally reinforced with a 1/8-inch x 2-inch aluminum rail insert that allows this rail to span 10 feet. See Figures 8 & 9.

3.5.5. The *DekPro Prestige* top un-routed rail is composed of a 6005-T5 Franklin gripping profile. The bottom rail utilizes a one-piece rail profile. See Figures 10 & 11.

3.6. Balusters and connectors:

3.6.1. The infill area for all styles utilize 6063-T6 aluminum balusters that are 3/4" square or 3/4" diameter round balusters. See Figure 14.

3.6.2. The *Ultra Advantage*, *DekPro Prestige*, *Coastal Aluminum*, and *1200 Series* guardrails use a 0.66 in diameter by 0.69 in high HDPE connector that is attached to the top and bottom un-routed rails with stainless steel fasteners or aluminum rivets with a stainless-steel mandrel per the Table 2 Fastening Schedule.





3.6.3. The *Ultra Rail* and *Ultra Deck-Over* guardrails utilize a 1-1/8-inch-wide by 3/4 in high HDPE strip inserted into the *Ultra Rail A* top & inverted *Rail A* bottom routed rail profiles. The connectors on the HDPE strip drop through routed holes in the rail allowing the balusters to friction connect to the HDPE strip. See Figure 5 which shows the HDPE insert and its location in the routed aluminum railings.

3.7. A bottom rail support block is composed of 3/4" square x 2-inch-long, hollow 6063-T6 aluminum, extrusion secured to the underside of the bottom rail with a stainless-steel fastener and secured to the deck surface with a cast aluminum collar bracket. See Figure 13 and Table 2 Fastening Schedule. The support block is located at mid-span for the 96-inch railing and at the 1/4 and 3/4 span locations for the 120-inch railing.

3.8. Aluminum Posts:

3.8.1. The 2-inch square by 0.125-inch wall post is extruded 6005-T5 aluminum tube with internal screw slots. See Figure 18.

3.8.2. The 2-1/2-inch square by 0.10-inch wall residential post is extruded 6005-T5 aluminum tube with internal screw slots. See Figure 19.

3.8.3. The 3-inch square by 0.125-inch wall residential post is extruded 6005-T5 aluminum tube with internal screw slots. See Figure 20.

3.8.4. The 3-inch square by 0.125-inch wall commercial post is extruded 6005-T5 aluminum tube with internal screw slots. See Figure 21.

3.9. All aluminum components are factory powder coated in four different satin colors: Black, Bronze, Khaki and White.

4.0 PERFORMANCE CHARACTERISTICS

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

5.0 INSTALLATION

5.1. General:

The *Ultra Rail*, *Ultra Advantage*, *Ultra Deck-Over*, *DekPro Prestige*, *USA Vinyl*, and *Coastal Aluminum* railing systems described in this Research Report 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. Application:

5.2.1. The *Ultra Rail*, *Ultra Advantage*, *Ultra Deck-Over*, *DekPro Prestige*, and *Coastal Aluminum* railing systems top and bottom rails are attached directly to structural posts utilizing cast aluminum mounting brackets via mechanical fasteners. See Figures 15 to 17 and Table 2 Fastening Schedule.

5.2.2. Infill aluminum balusters are inserted onto 0.66-inch diameter HDPE plugs for the *Ultra Advantage*, *DekPro Prestige*, and *Coastal Aluminum* railing systems. See Figure 12. For the *Ultra Rail* and *Ultra Deck-Over* railing systems, the balusters are installed onto a 1-1/8-inch-wide by 3/4-inch-high HDPE strip inserted into the top and bottom routed rails. See Figures 5.

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

6.3. Anchorage of the structural post is not within the scope of this report and is subject to evaluation and approval by the building official. Anchors must satisfy the design load requirements specified in Chapter 16 of the building code and must meet the following minimum requirements.





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

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, installation must include anchorage to suitable structural framing. Decking is not considered structural framing, and anchorage to decking alone is not an approved installation method.

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

6.4. 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.

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

6.6. Ultra Aluminum Manufacturing Inc. manufactures the *Ultra Rail*, *Ultra Advantage*, *Deck-Over*, *DekPro Prestige*, *USA Vinyl*, and *Coastal Aluminum* railing systems in Howell, Michigan in accordance with an approved quality control system that includes independent third-party inspections by Intertek.

7.0 SUPPORTING EVIDENCE

7.1. Drawings and installation instructions submitted by Ultra Aluminum Manufacturing Inc.

7.2. Reports of testing demonstrating compliance with the performance requirements of ICC-ES AC273, Acceptance Criteria for Handrails and Guards, revised March 2016.

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

8.0 IDENTIFICATION

The *Ultra Rail*, *Ultra Advantage*, *Ultra Deck-Over*, *DekPro Prestige*, *USA Vinyl*, and *Coastal Aluminum* railing systems described in this Research Report are identified by a marking bearing the report holder's name (Ultra Aluminum Manufacturing Inc.), the Intertek mark, and the Code Compliance Research Report number (CCRR-0223) and the following statement: "See CCRR-0223 at <https://whdirectory.intertek.com> for uses and performance levels."



9.0 FLORIDA BUILDING CODE

9.1. Scope of Evaluation:

The aluminum guardrail systems recognized in this report were evaluated for compliance with the 2017 *Florida Building Code – Building* and 2017 *Florida Building Code – Residential*.

9.2. Conclusion:

The aluminum guardrail systems, described in Sections 2.0 through 7.0 of this Research Report, comply with the 2017 *Florida Building Code – Building* and 2017 *Florida Building Code – Residential*, including High Velocity Hurricane Zones (HVHZ).

9.3. Intertek is a quality assurance entity approved by the Florida Building Commission.

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 AND 2012 IBC	2015 AND 2012 IRC	2017 FBC	2017 FBC-RESIDENTIAL
Structural Performance	1607.8	R301.5	1607.8	R301.5

TABLE 2 – CODE OCCUPANCY CLASSIFICATION

Guardrail System	Guardrail Type	Post	IBC ⁽¹⁾⁽²⁾	IRC ⁽¹⁾⁽³⁾
Ultra Rail	Level	2-1/2"	62-1/2" x 42"	97-1/4" x 36"
		3" Residential	92-1/2" x 42"	97-1/4" x 36"
Ultra Deck-Over	Level	2"	n/a	60-1/2" x 36"
		2-1/2"		
		3" Residential		
Ultra Advantage	Level	2-1/2"	62-1/2" x 42"	97-1/4" x 36"
		3" Residential	92-1/2" x 42"	97-1/4" x 36"
Ultra Advantage Jefferson Coastal Aluminum Rail 1200 Series Railing USA Vinyl Railings (With Top Rail Reinf'g)	Level	3" Commercial	119-1/2" x 42"	119-1/2" x 36"
DekPro Prestige	Level	2-1/2"	62-1/2" x 42"	97-1/4" x 36"
		3" Residential	92-1/2" x 42"	97-1/4" x 36"

⁽¹⁾ Level rail lengths are maximum clear length between supports. Railing height is the minimum installed height from walking surface to top of top rail.

⁽²⁾ All Use Groups

⁽³⁾ One- and Two-Family Dwellings





TABLE 3 – FASTENING SCHEDULE

Connection	Fastener
Top / Bottom Rail Bracket to Post ⁽¹⁾	Two 1/4-20 x 1" Phillips drive, flat-head, Type F thread cutting point, stainless steel ⁽²⁾ screws or Two 1/4-14 x 1" Phillips drive, flat-head, self-drilling, stainless steel ⁽²⁾ screws
Top / Bottom Rail Bracket to Rail ⁽¹⁾	One 1/4-20 x 1" Phillips drive, flat-head, Type F thread cutting point, stainless steel ⁽²⁾ screw or One 1/4-14 x 1" Phillips drive, flat-head, self-drilling, stainless steel ⁽²⁾ screw
HDPE Baluster Plug to Top / Bottom Rail ⁽¹⁾	One #10-24 x 3/4" Phillips drive, flat-head, Type F thread cutting point, stainless steel ⁽²⁾ screw or One 3/16 in diameter aluminum body with steel mandrel blind rivet
Support Block to Bottom Rail	Slip fit onto HDPE baluster plug which is attached with one #10-24 x 3/4" Phillips drive, flat-head, Type F thread cutting point, stainless steel ⁽²⁾ screw
Post to Substructure	Four 3/8-inch dia. anchor bolts. (See Section 6.2 for additional requirements)

⁽¹⁾ Pre-drilled 13/64-inch diameter

⁽²⁾ 300 Series stainless steel

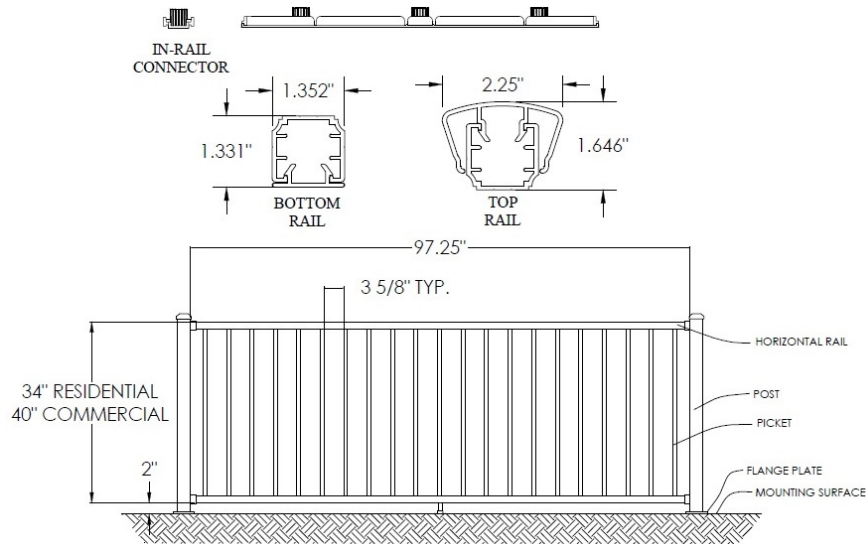
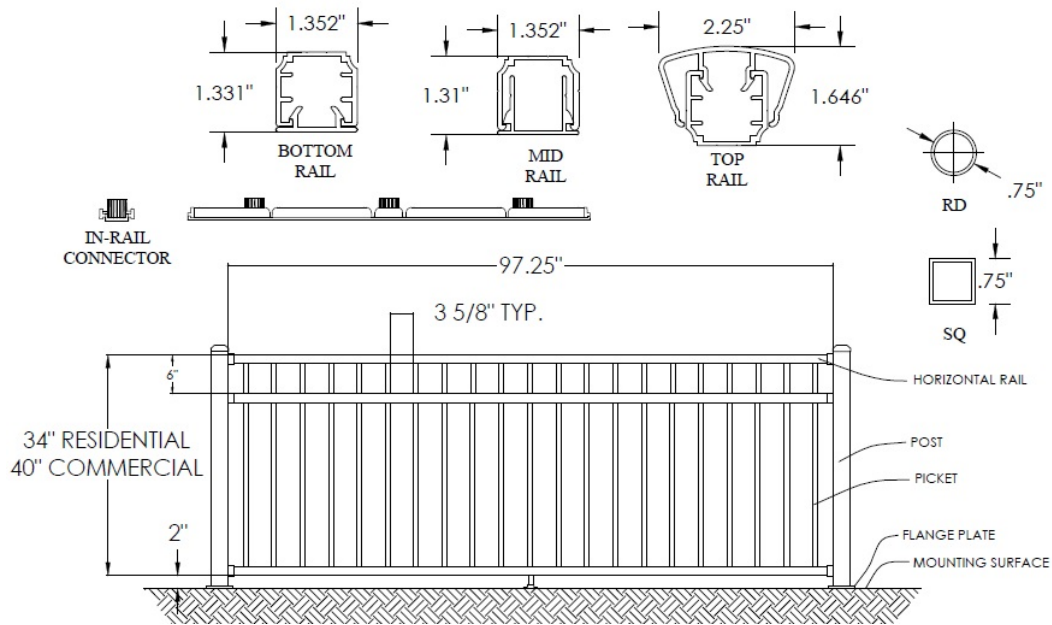


FIGURE 1 - ULTRA RAIL ALUMINUM TWO RAIL SYSTEM
(Franklin Top Rail Profile shown)
(Jefferson Top Rail Profile available, not shown)





**FIGURE 2 - ULTRA RAIL ALUMINUM THREE RAIL SYSTEM
(Franklin Top Rail Profile shown)
(Jefferson Top Rail Profile available, not shown)**

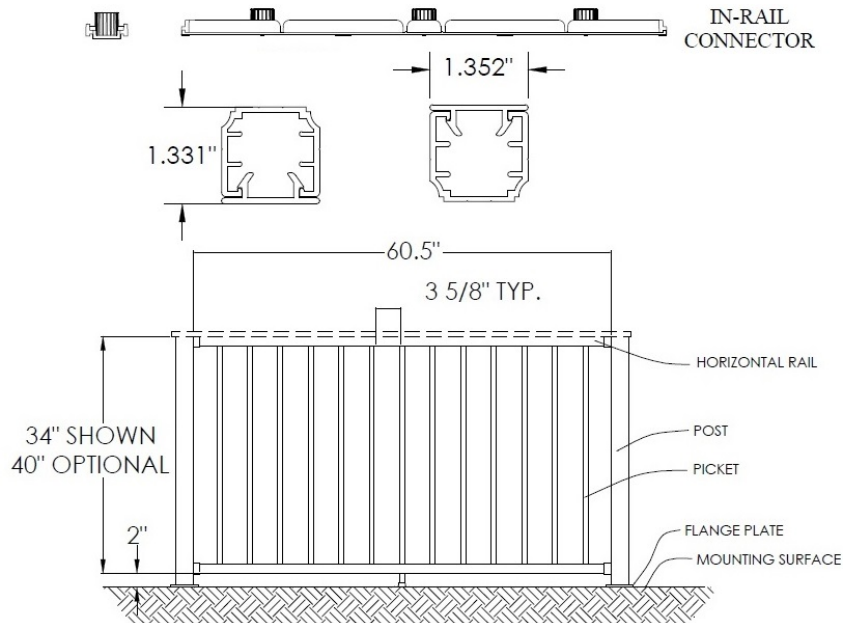


FIGURE 3 - DECK-OVER ALUMINUM TWO RAIL SYSTEM

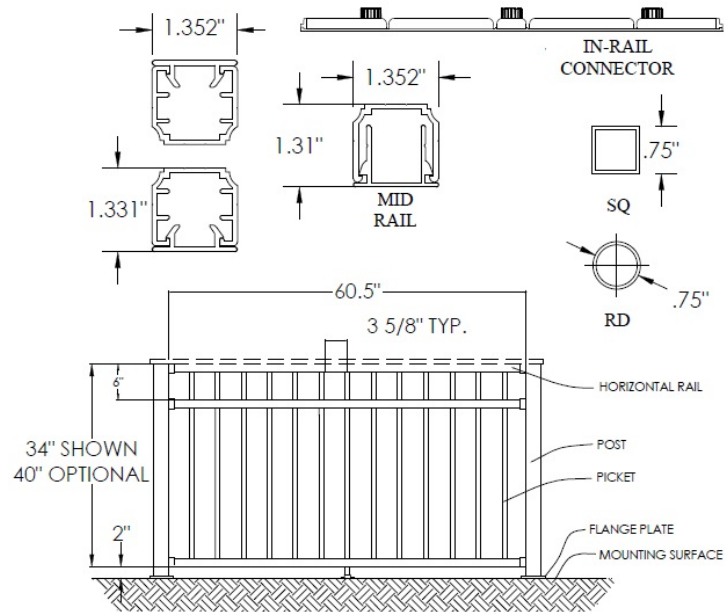
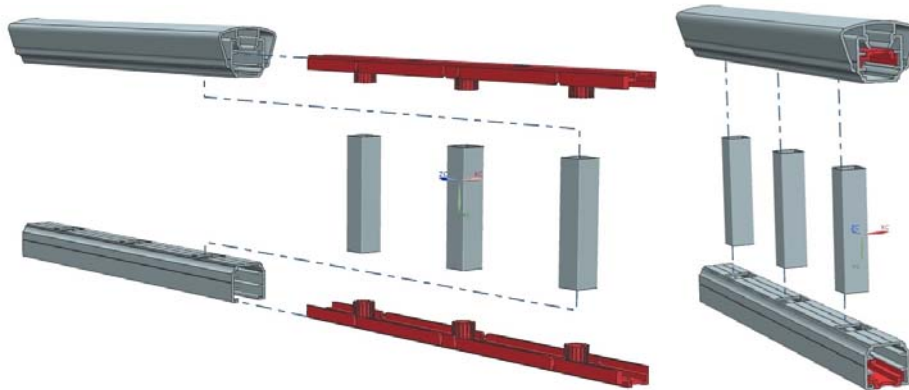


FIGURE 4 – DECK-OVER ALUMINUM THREE RAIL SYSTEM



**FIGURE 5 – ULTRA MAX & DECK-OVER ALUMINUM RAILING SYSTEM
(with HDPE insert strip for baluster connections)**

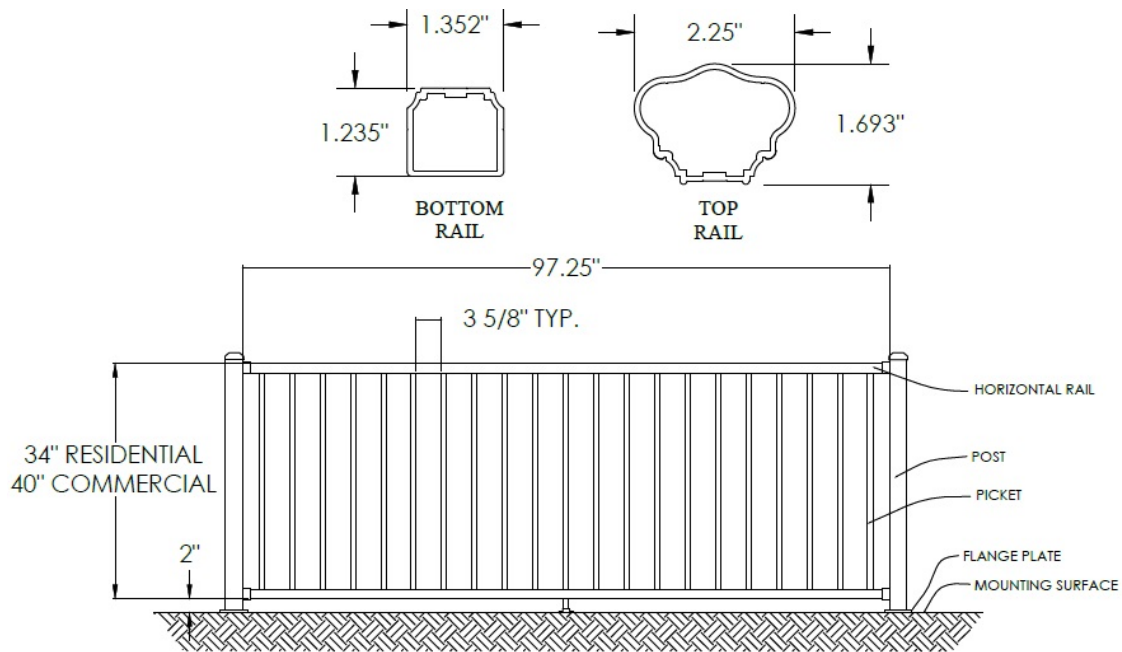


FIGURE 6 – ULTRA ADVANTAGE ALUMINUM TWO RAIL SYSTEM
(Jefferson Top Rail Profile shown)
(USA Vinyl LLC - Jefferson Top Rail Profile)

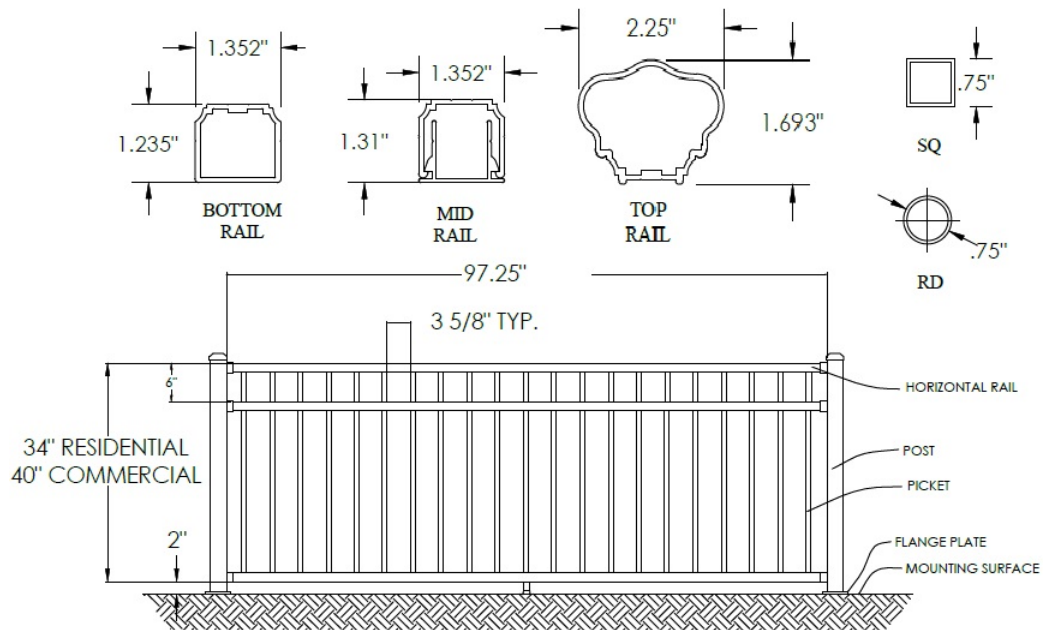


FIGURE 7 – ULTRA ADVANTAGE ALUMINUM THREE RAIL SYSTEM
(Jefferson Top Rail Profile shown)
(USA Vinyl LLC - Jefferson Top Rail Profile)

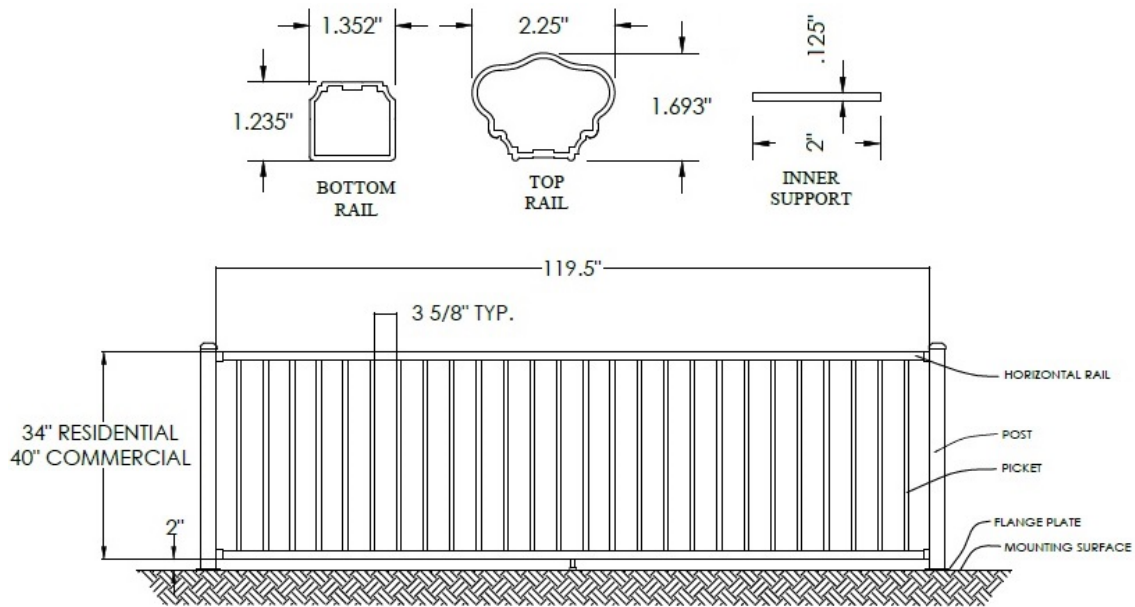


FIGURE 8 – ULTRA ADVANTAGE ALUMINUM TWO RAIL SYSTEM
(Jefferson profile with inner reinforcing rail)
(USA Vinyl LLC - Jefferson Top Rail Profile)

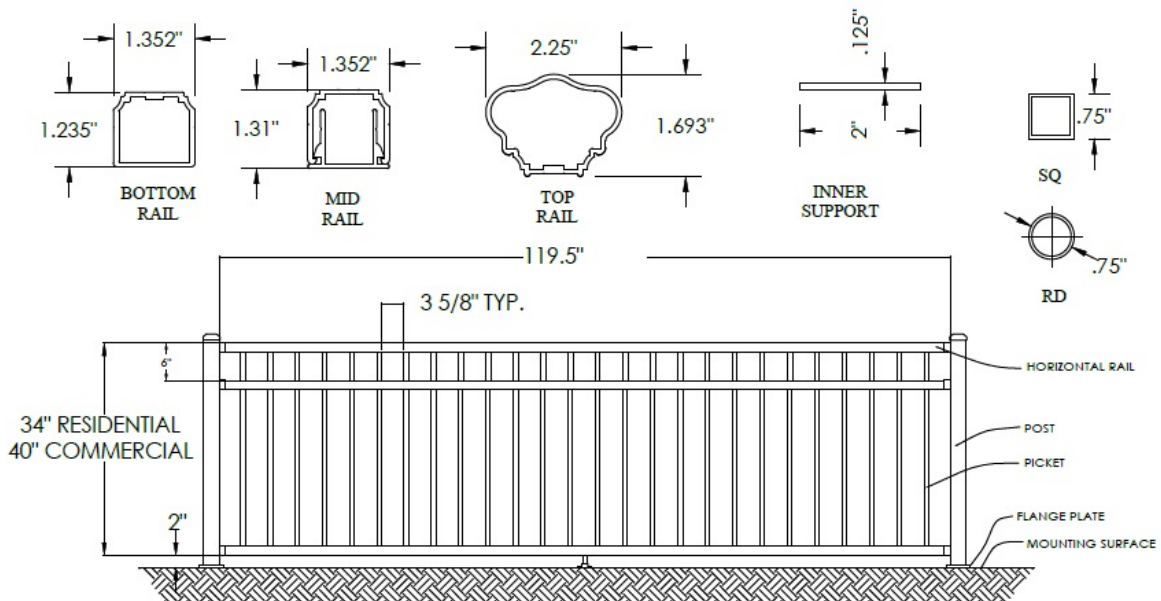


FIGURE 9 – ULTRA ADVANTAGE ALUMINUM THREE RAIL SYSTEM
(Jefferson profile with inner reinforcing rail)
(USA Vinyl LLC - Jefferson Top Rail Profile)



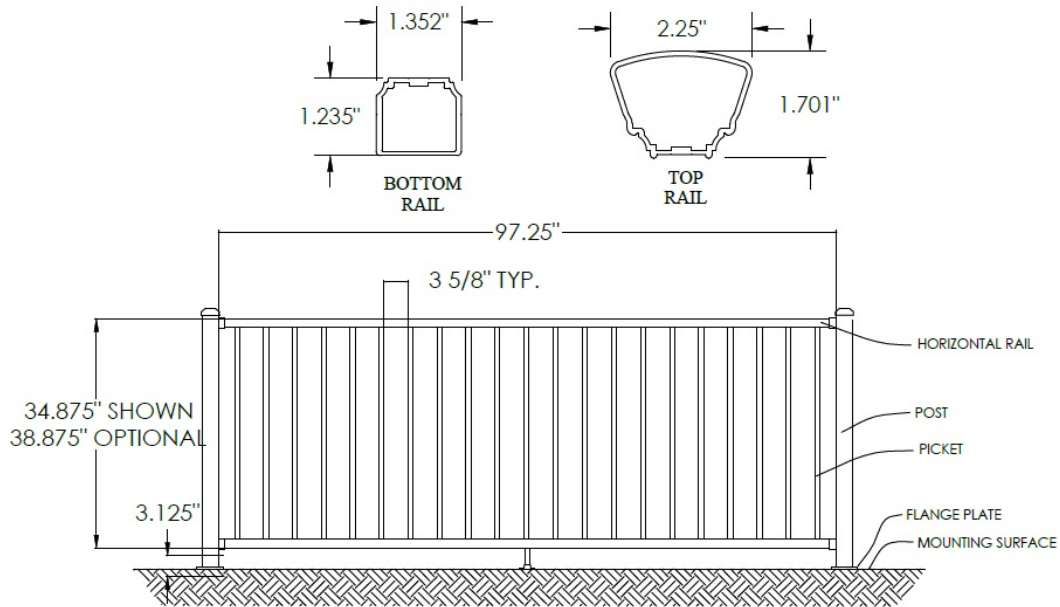


FIGURE 10 – DEKPRO PRESTIGE ALUMINUM TWO RAIL SYSTEM

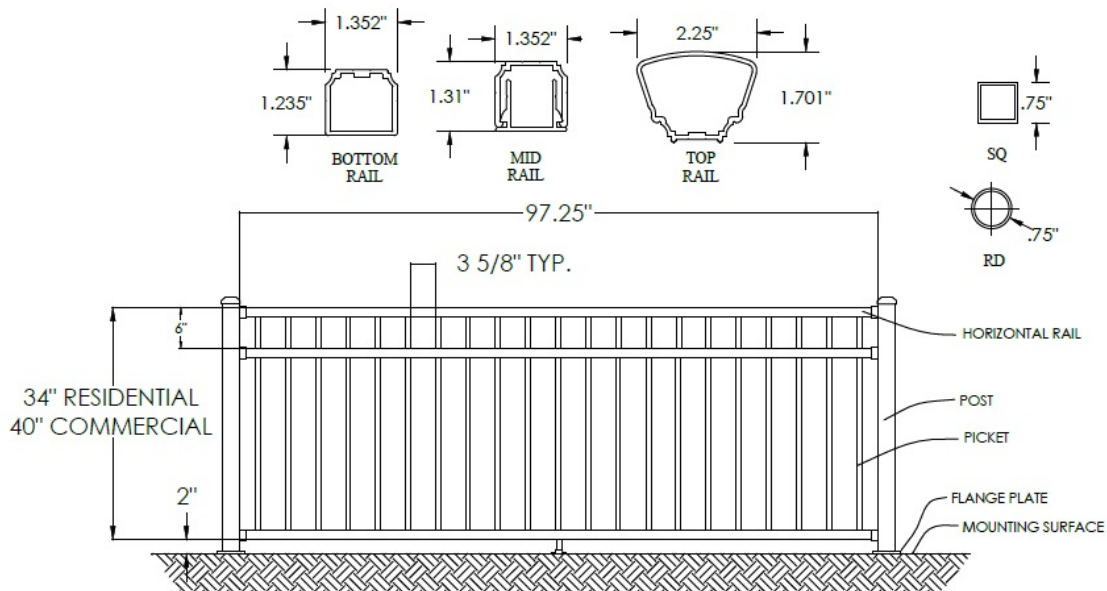


FIGURE 11 – DEKPRO PRESTIGE ALUMINUM THREE RAIL SYSTEM



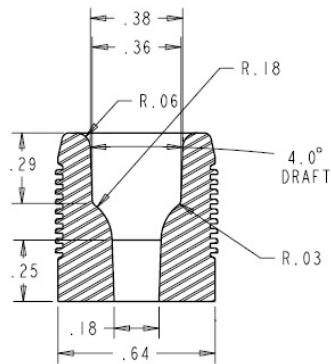


FIGURE 12 – HDPE CONNECTORS FOR ULTRA ADVANTAGE & DEKPRO BALUSTERS (For top and bottom rails)

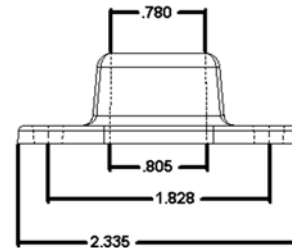
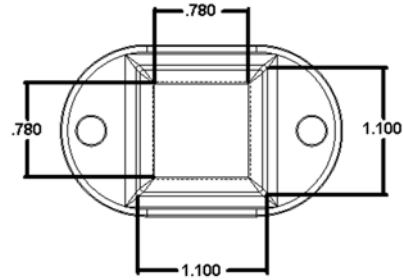
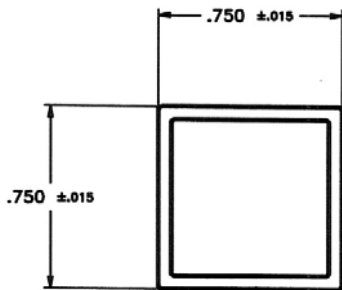
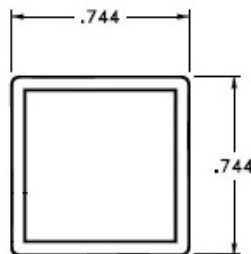


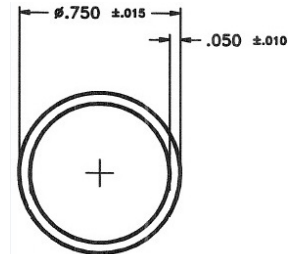
FIGURE 13 – BOTTOM RAIL FOOT BLOCK



(0.05-inch wall)



(0.055-inch wall)



(0.05-inch wall)

Ultra Max Baluster

FIGURE 14 – ALUMINUM BALUSTERS

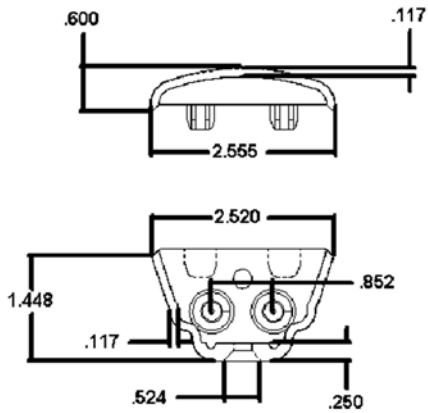


FIGURE 15 – Franklin Top Rail Bracket

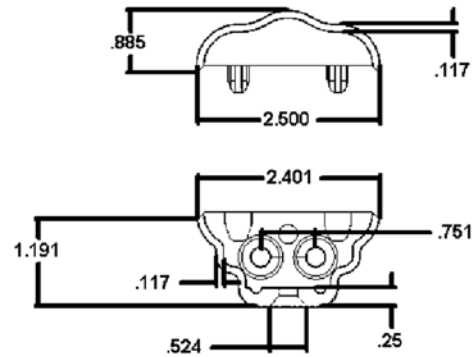


FIGURE 16 – Jefferson Top Rail Bracket

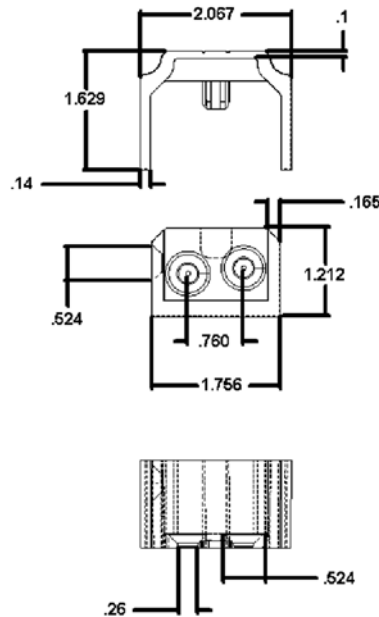
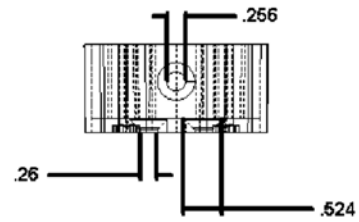
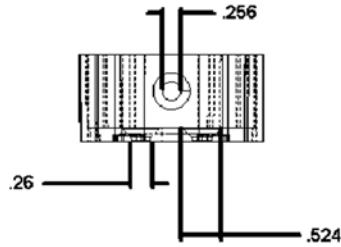


FIGURE 17 – DECK-OVER, MID-RAIL OR BOTTOM RAIL BRACKET

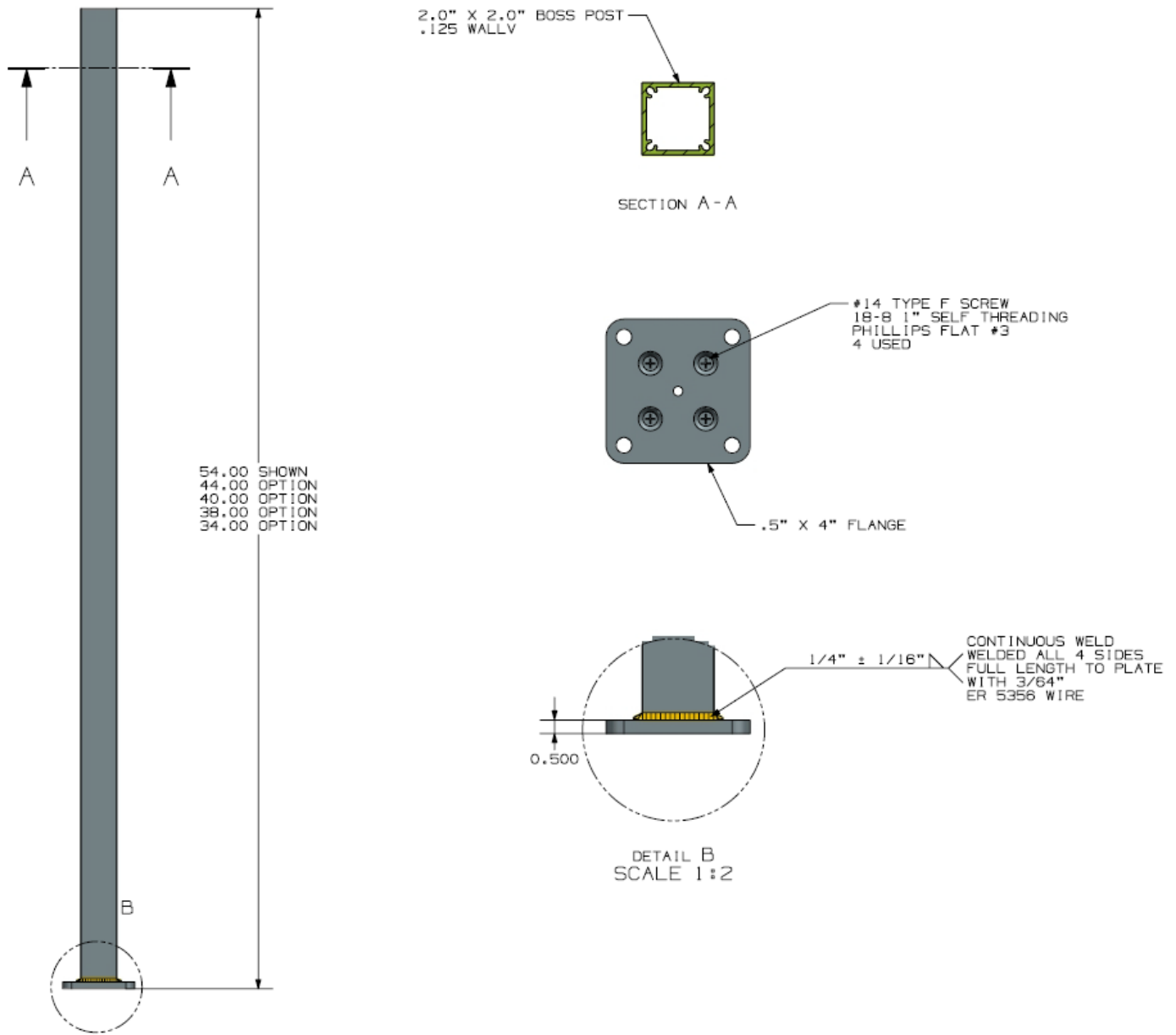


FIGURE 18 – 2 INCH POST

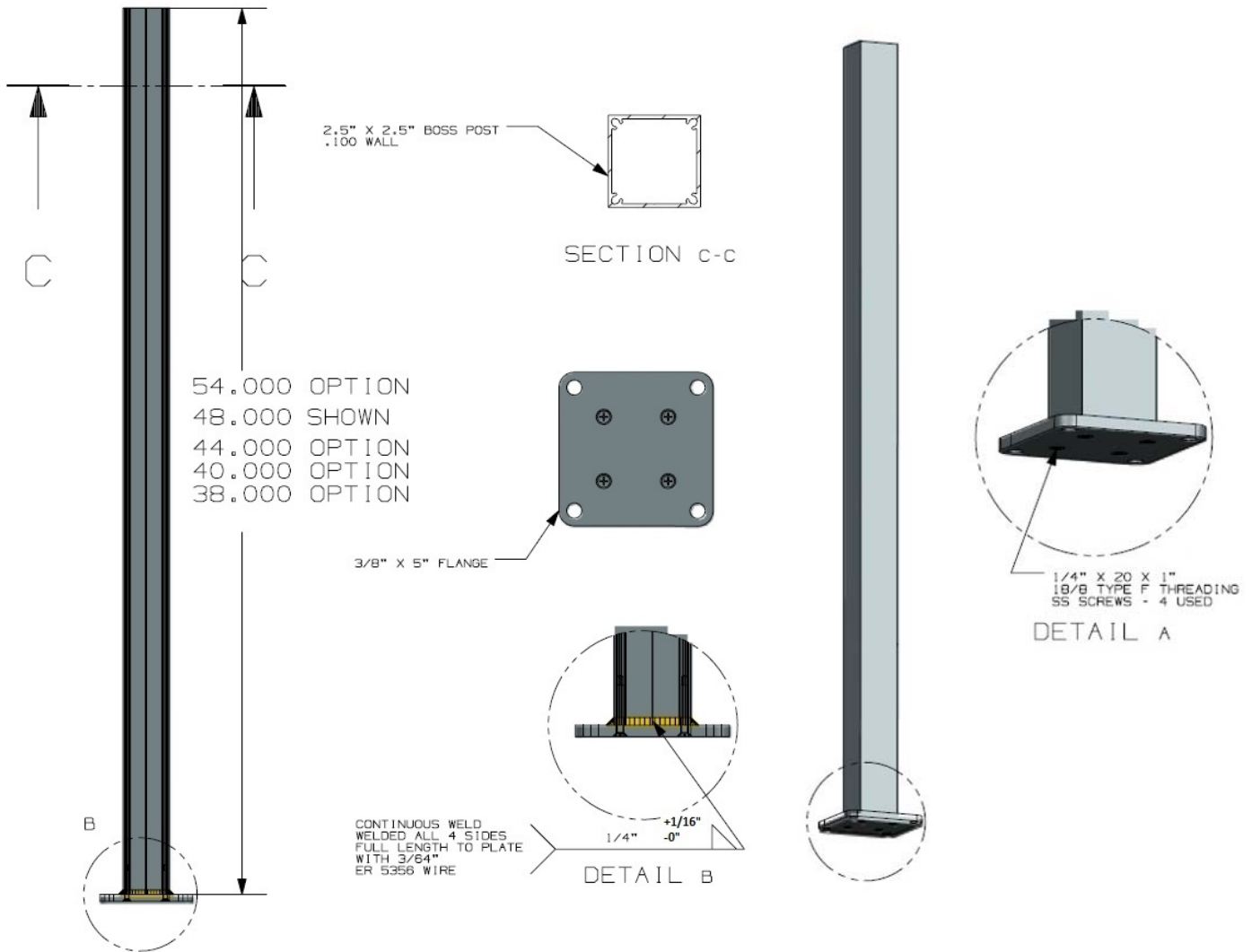


FIGURE 19 – 2-1/2 INCH POST

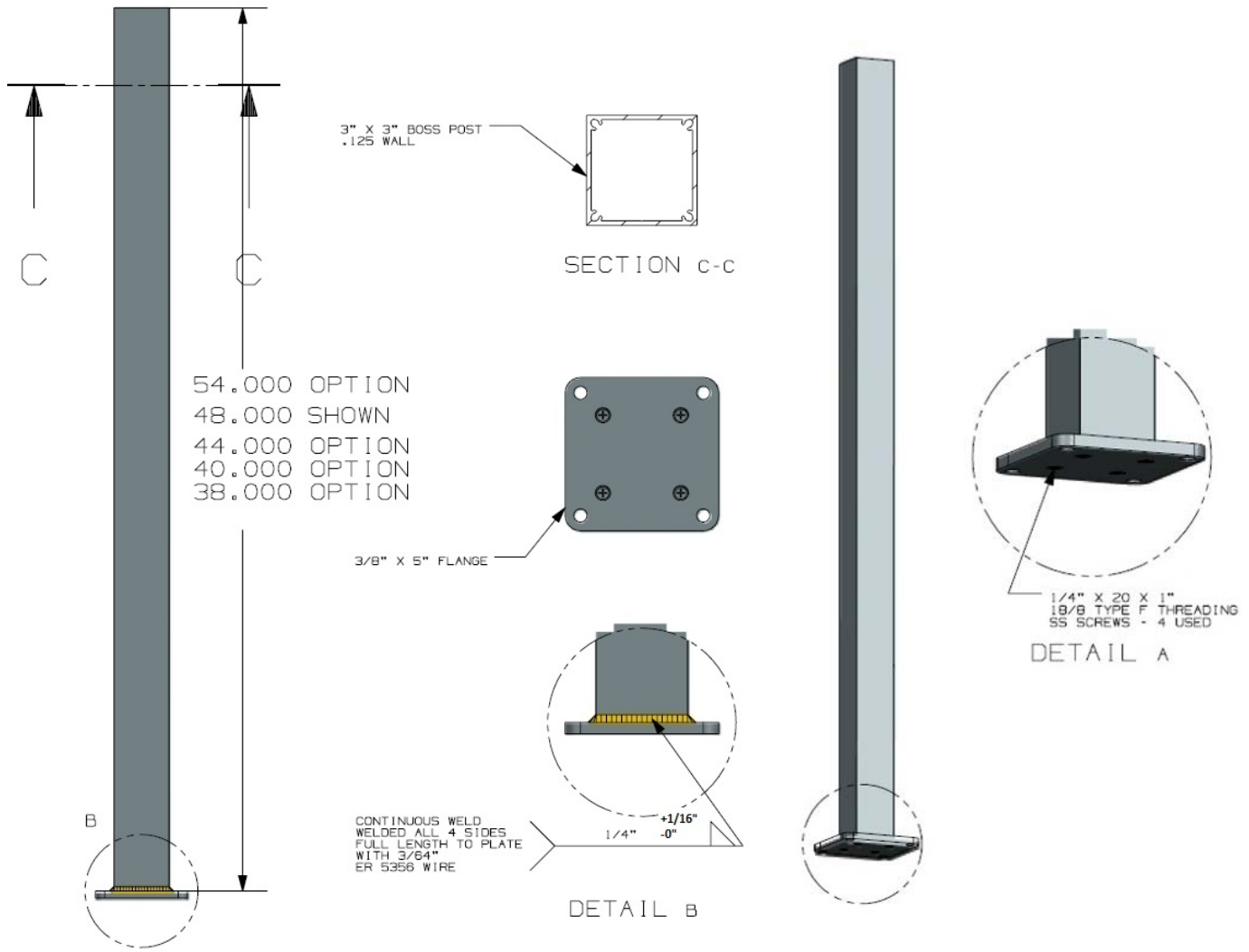


FIGURE 20 – 3 INCH RESIDENTIAL POST

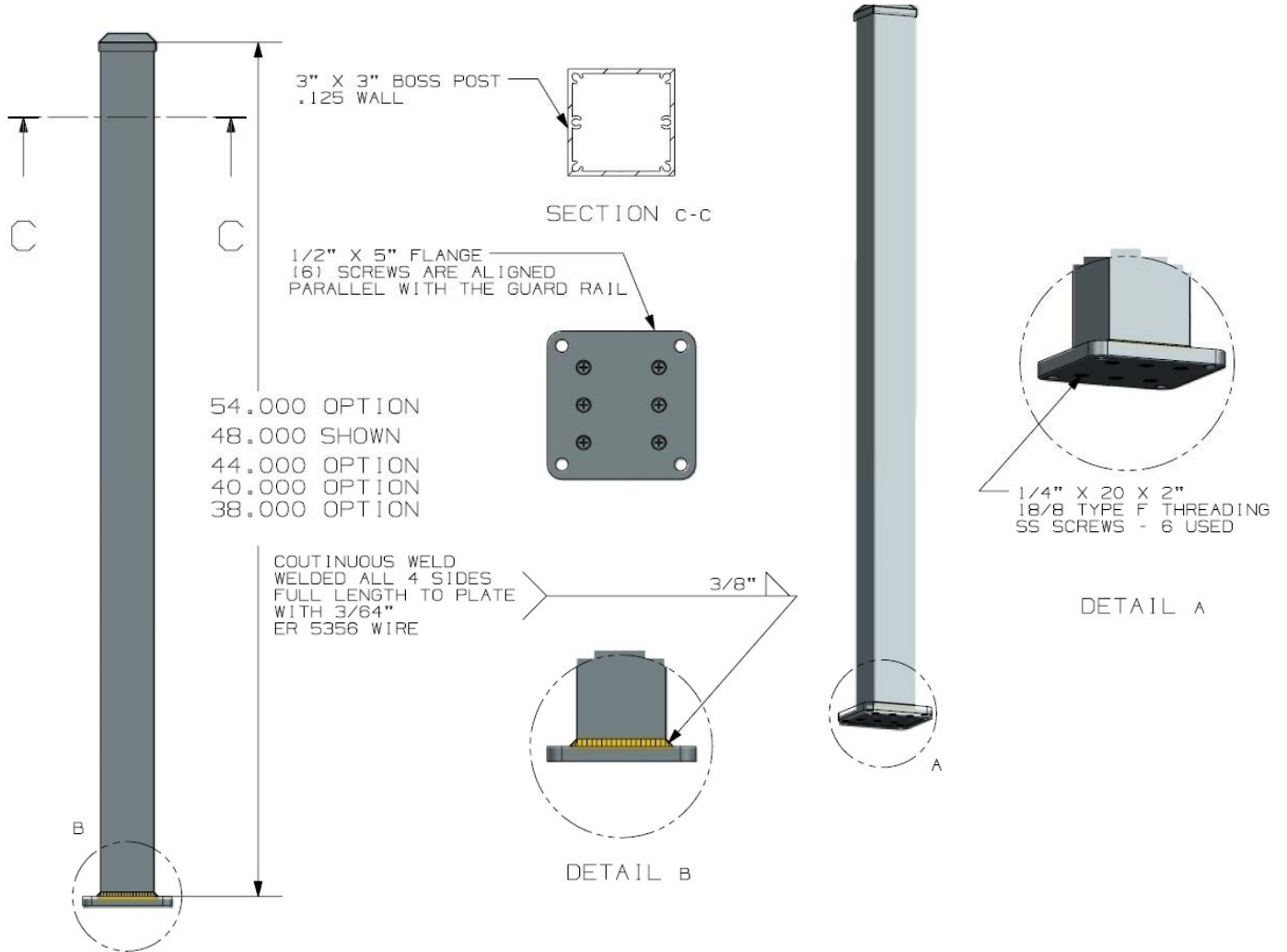


FIGURE 21 – 3 INCH COMMERCIAL POST

