Code Compliance Research Report
CCRR-0213

Issue Date: 08-01-2014
Revision Date: 08-06-2025
Renewal Date: 08-31-2026

DIVISION: 05 50 00– METAL FABRICATIONS
Section: 05 52 00 – Metal Railings

REPORT HOLDER:
Key Link Fencing & Railing, Inc.
150 Orlan Road
New Holland, Pennsylvania 17557
(717) 355-7139
www.keylinkfencing.com

REPORT SUBJECT:
Aluminum Railing Systems
Keystone Series
American Series
Arabian Series

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)

1.2 The *Aluminum Railing Systems* have been evaluated for the following properties (see Table 1):

- Structural Performance

1.3 *Aluminum Railing Systems* have been evaluated for the following uses (see Table 2):

- Guards are provided as level guards for level walking areas such as decks, balconies, and porches under the definitions of the referenced codes.
- Guards are intended for use at or near the open sides of elevated walking areas as required by the referenced codes.

2.0 STATEMENT OF COMPLIANCE

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 Level guards are provided with rail lengths up to 96 inches in length (measured between the inside of support posts) and an installed height of 36 or 42 inches. See Table 1 for qualified configurations.

3.2 Materials and Processes - The *Aluminum Railing Systems* are an assemblage of extruded aluminum materials, extruded poly vinyl chloride (PVC) baluster retainers, stainless steel fasteners, and cast aluminum bracket materials.

3.3 The system is available in various colors and architectural grade powder coated finishes.

3.4 Components - The guardrail system includes a top rail, a top rail subassembly, a bottom rail, a baluster retainer in each rail, vertical balusters, a welded structural post, rail-to-post brackets, and decorative moldings and post caps.

3.4.1 Rails - Each of the top and bottom aluminum rails are routed to accept 0.75 inch square infill components described in Section 3.4.2 for the various railing systems as shown in Figure 1 through Figure 4.

3.4.1.1 The top rail caps are extruded 6105-T6 aluminum rails 1.75 inches wide by 0.95 - 1.03 inches tall. The top rail caps snap onto a 1.25 inch wide by 1.50 inch tall 6105-T6 aluminum sub rail assembly. A PVC rail insert is used as a baluster retainer. See Figure 2 through Figure 4.

3.4.1.2 The bottom rails are extruded 6063-T6 aluminum rails are 1.25 inches wide by 1.50 inches tall. A PVC rail insert is used as a baluster retainer. See Figure 2 through Figure 4.

3.4.2 The infill area for all styles is configured with 6063-T4, 6063-T5 or 6063-T52 aluminum balusters. See Figures 11 through 19.

3.4.3 Structural support posts are hollow square 6063-T6 and 6005-T5 aluminum extrusions with 0.125 inch walls. The extrusions are welded to square aluminum base plates. See Figures 20 through 22.

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 the IBC and Section R301 of the IRC when tested in accordance with ICC-ES AC273.

5.0 INSTALLATION

5.1 General:

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 Application:

5.2.1 The top and bottom rails are attached directly to structural posts utilizing cast aluminum mounting brackets via mechanical fasteners. See Table 3 and Figure 5 through Figure 9.

5.2.2 Guards may be assembled in various configurations. Refer to Figure 1 through Figure 4 for overall assembly and Table 3 for the fastening schedule.

5.2.3 Infill components (aluminum balusters) are inserted into routed holes in the aluminum rails and secured via PVC baluster retainers that are installed internally to the rails. See Figure 1 through Figure 4, and Figure 11 through Figure 18.

5.2.4 Shim plates are utilized under the base of the structural post. The hardware used to anchor the base of the structural post to the supporting structure is installed so that it passes through the concave corners of the shim plates. Shim plates are 0.055 inch thick 304 stainless steel plates. See Figure 10.

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

6.3 Shim plates must be used for all structural post installations as described in Section 5.4.

6.4 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:

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

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

6.4.3 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.

6.4.4 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 The 304 stainless steel shim plates are used to prevent direct contact between the structural post base plate and supporting structure. Compatibility of fasteners and other metallic components with the supporting structure, including chemically treated wood, is outside the scope of this report.

6.6 Key Link Fencing & Railing, Inc. operates in accordance with an approved quality control system that includes independent inspections by Intertek.

7.0 SUPPORTING EVIDENCE

7.1 Drawings and installation instructions submitted by Key Link Fencing & Railing, 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. AC273 addresses requirements of the IBC and IRC.

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

8.0 IDENTIFICATION

The *Aluminum Railing Systems* are identified with the manufacturer's name (Key Link Fencing & Railing Inc.) address and telephone number, the product name (*Aluminum Railing Systems*), the statement "For use in One- and Two- Dwellings Only" (when applicable), the Intertek Mark as shown below, and the Code Compliance Research Report number (CCRR-0213).

CODE COMPLIANCE
Intertek
CCRR-0213

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.

TABLE 1 – PROPERTIES EVALUATED

PROPERTY	2015 IBC SECTION	2015 IRC SECTION	2012 IBC SECTION	2012 IRC SECTION
Structural Performance	1607.8	R301.5	1607.8	R301.5

TABLE 2 – CODE OCCUPANCY CLASSIFICATION

***Keystone*, *American*, and *Arabian* Aluminum Railing System Dimensions** [1]	**Guardrail Type**	**Post Type**	**Code Occupancy Classification**
96 inches wide by 36 inches high 96 inches wide by 42 inches high	Level	2-1/2" Post	IRC – One- and Two-Family Dwellings
72 inches wide by 36 inches high	Level	3-1/4" Post 4" Post	IRC – One- and Two-Family Dwellings
72 inches wide by 42 inches high	Level	3-1/4" Post 4" Post	IBC – All Use Groups IRC – One- and Two-Family Dwellings

[1] Guardrails are qualified up to and including the listed maximum guardrail system dimensions for use in the referenced Code Occupancy Classification.

TABLE 3 – FASTENING SCHEDULE

Connection	Fastener
All Rail Brackets to Post	Four #12 x 1" bevel-head, self-drilling, 304 stainless steel screws
Top Rail Bracket to Rail	Two #10 x ¾" pan-head, self-drilling, 304 stainless steel screws
Bottom Rail Bracket to Rail	No mechanical fastener

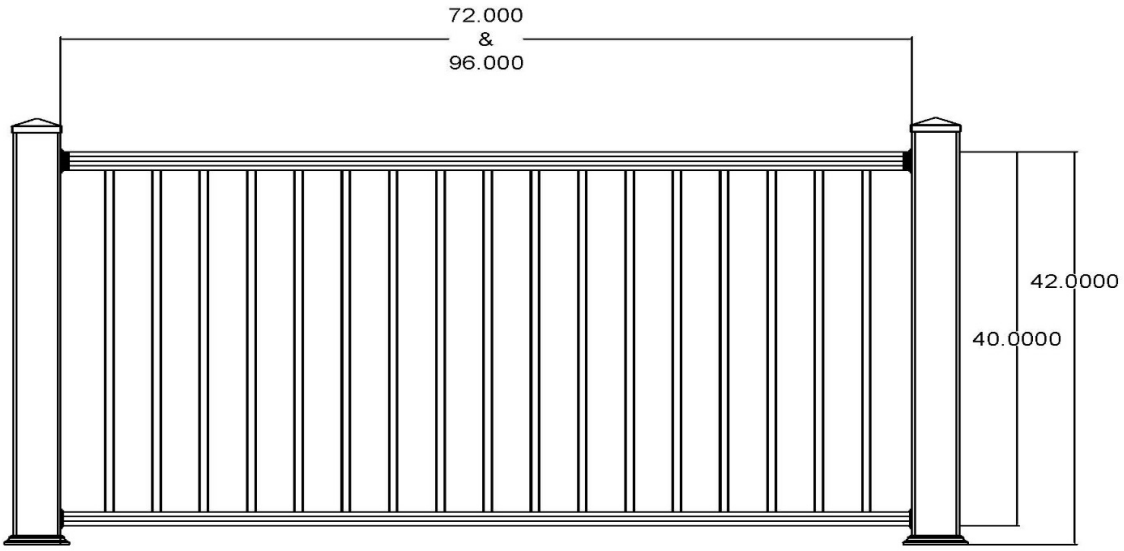


FIGURE 1 - *KEYSTONE*, *AMERICAN*, AND *ARABIAN* ALUMINUM RAILING SYSTEMS

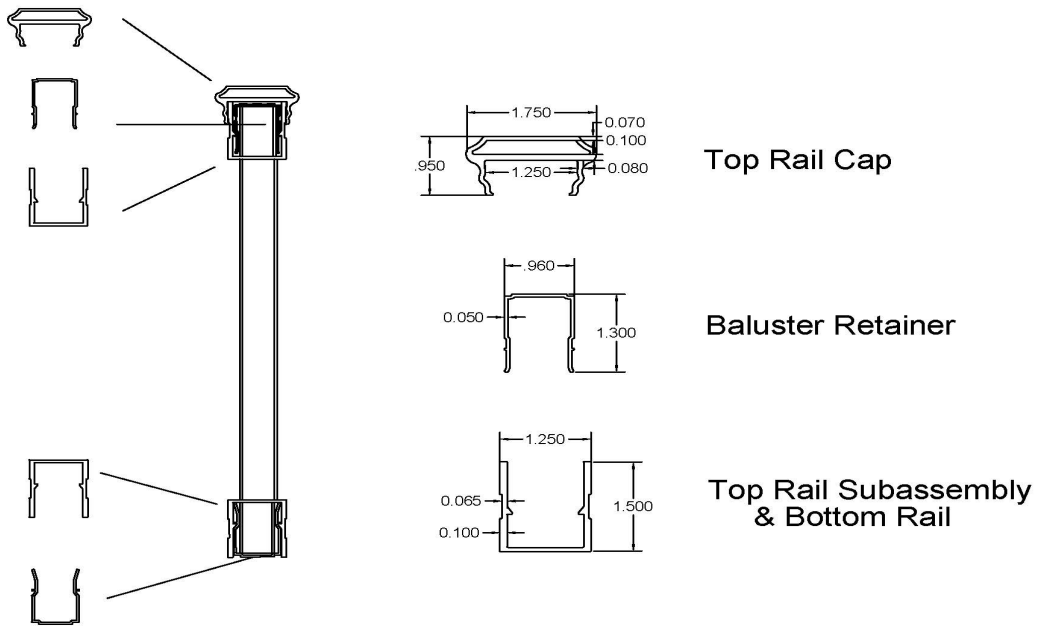


FIGURE 2 - *KEYSTONE* ALUMINUM RAILING SYSTEM

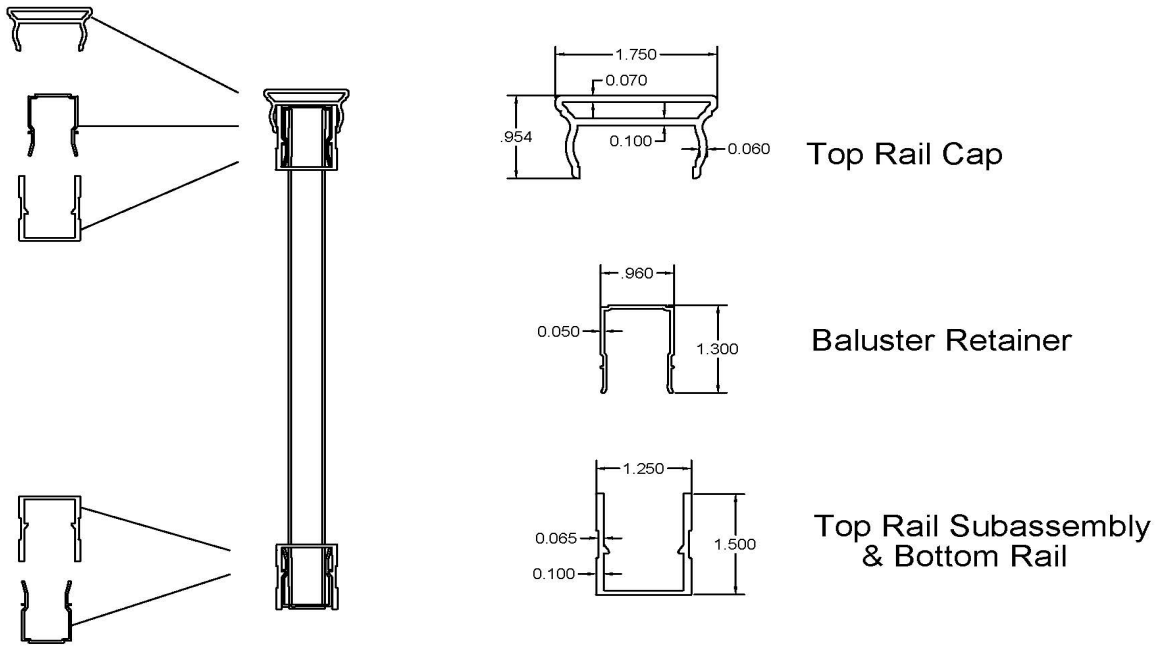


FIGURE 3 - *AMERICAN* ALUMINUM RAILING SYSTEM

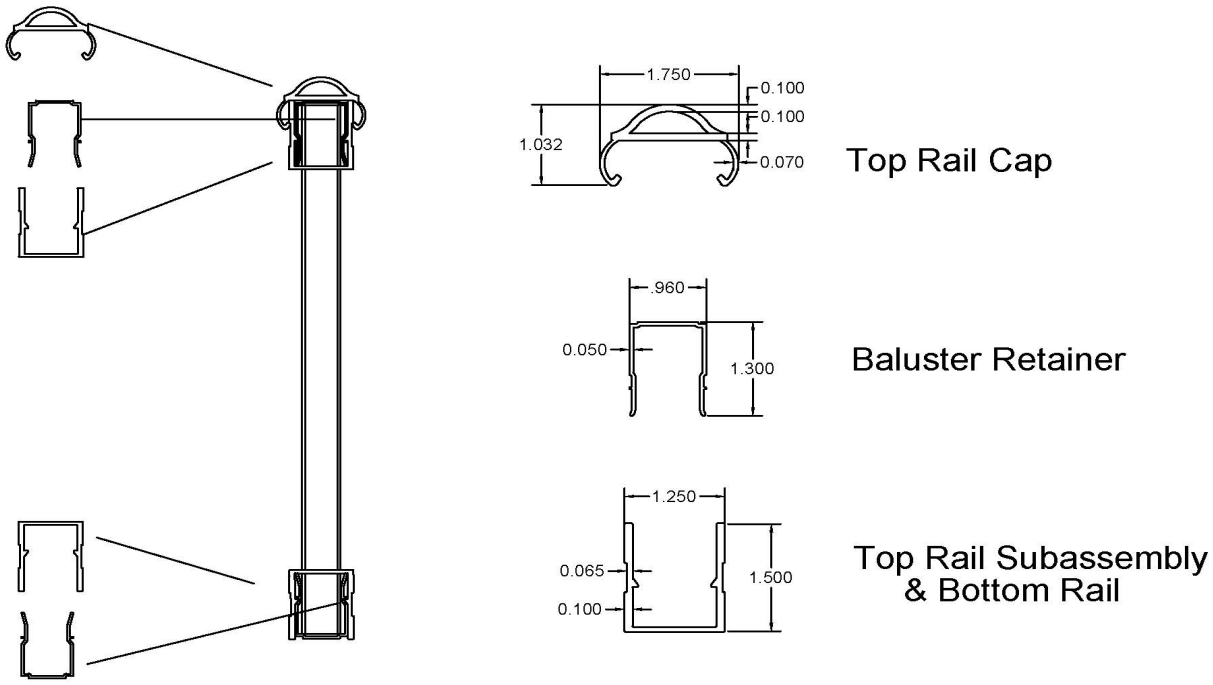


FIGURE 4 - *ARABIAN* ALUMINUM RAILING SYSTEM

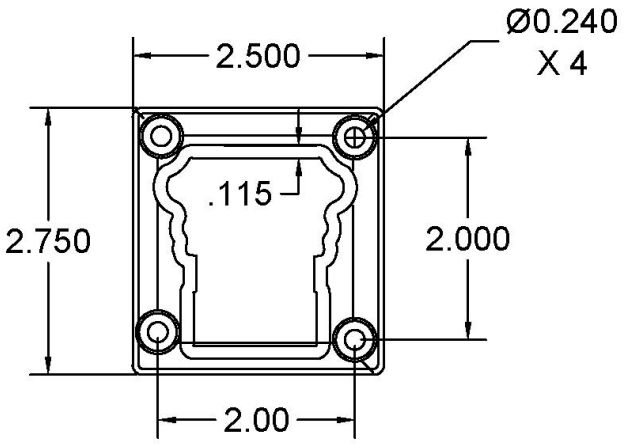


FIGURE 5 - *KEYSTONE* TOP RAIL BRACKET

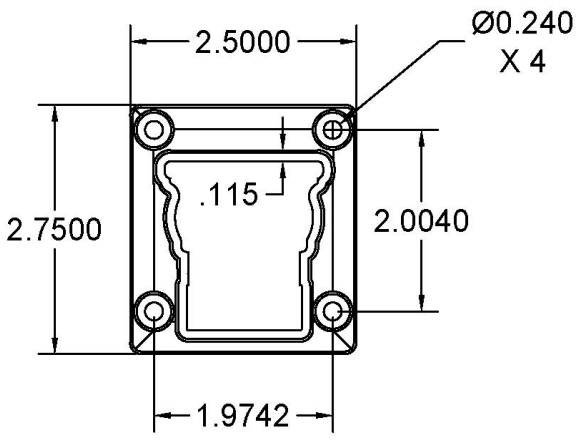


FIGURE 6 - *AMERICAN* TOP RAIL BRACKET

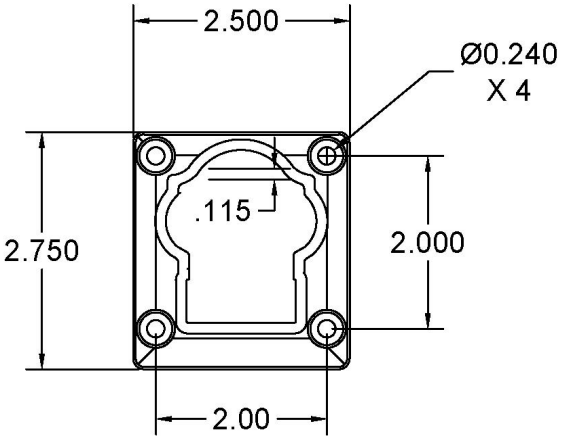


FIGURE 7 - *ARABIAN* TOP RAIL BRACKET

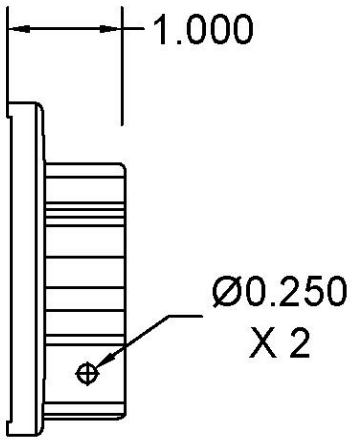


FIGURE 8 - *KEYSTONE*, *AMERICAN*, AND *ARABIAN* TOP RAIL BRACKETS SIDE VIEW

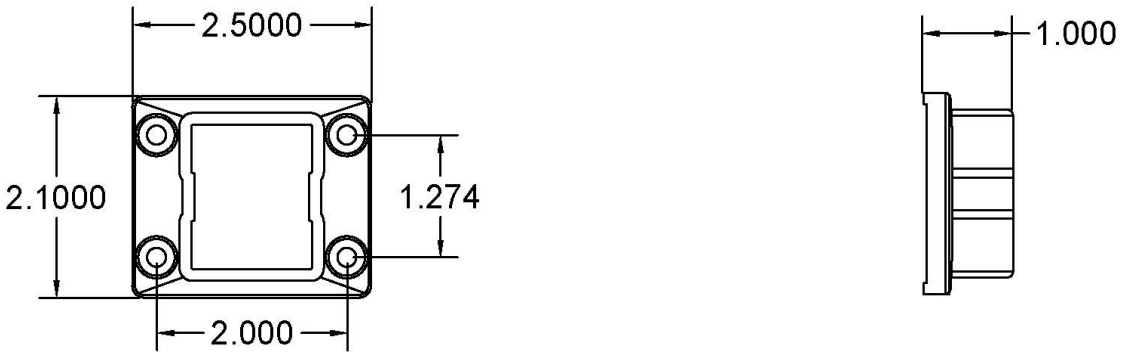


FIGURE 9 - *KEYSTONE*, *AMERICAN*, AND *ARABIAN* BOTTOM RAIL BRACKETS

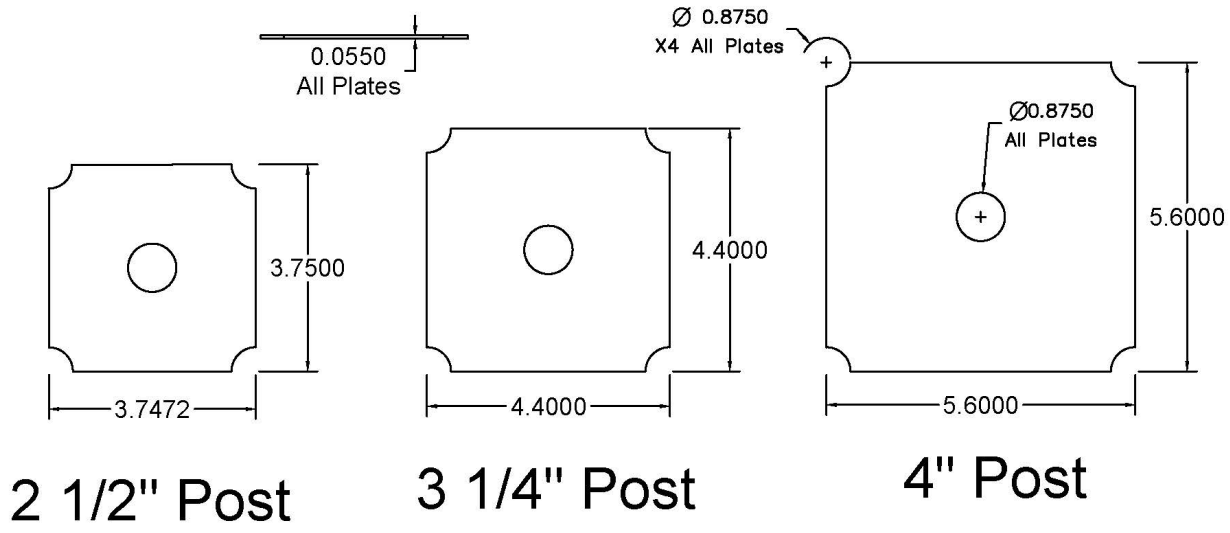
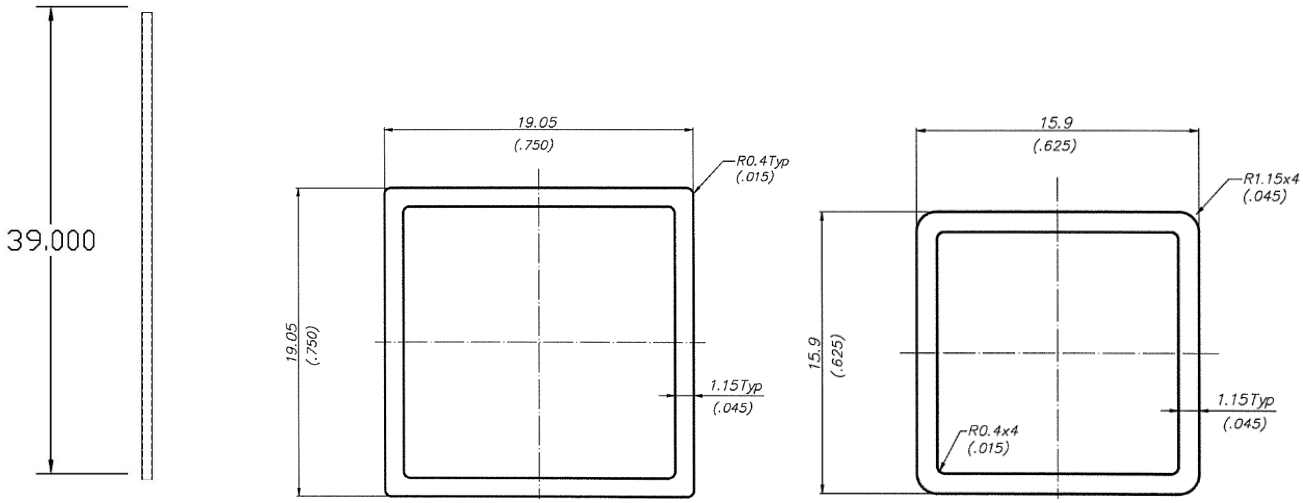


FIGURE 10 - STAINLESS STEEL SHIM PLATES



3/4" SQUARE 5/8" SQUARE

FIGURE 11 - SQUARE BALUSTERS

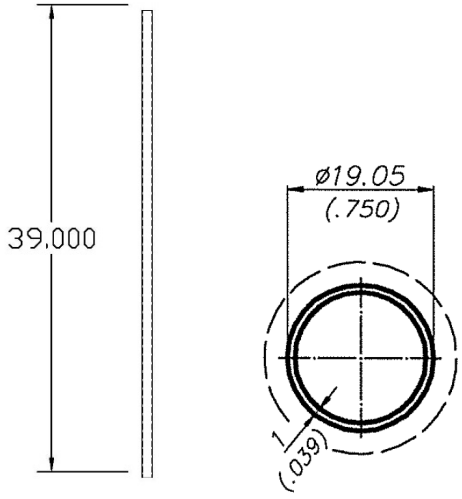


FIGURE 12 – ROUND BALUSTER

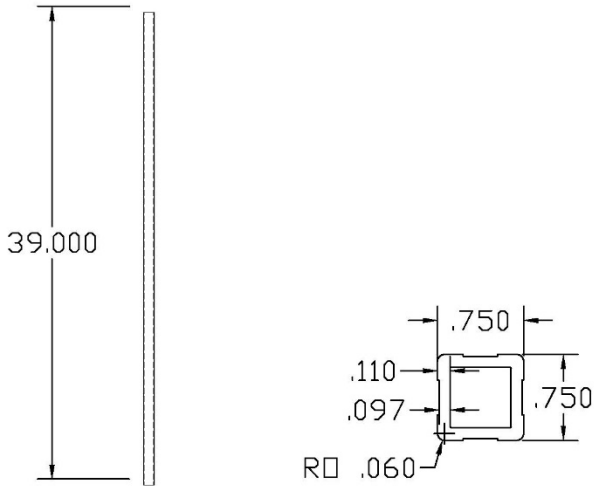


FIGURE 13 - INDENT BALUSTER

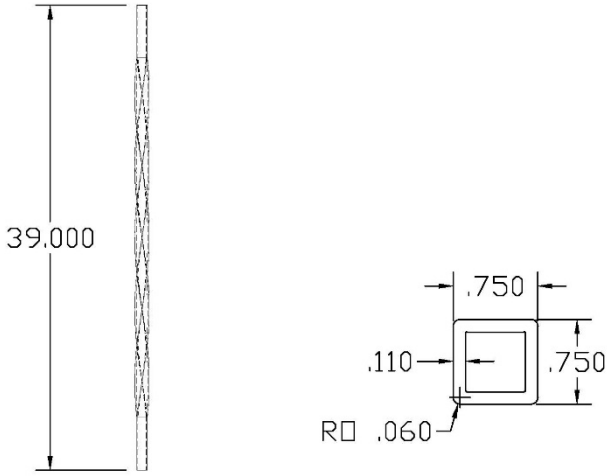


FIGURE 14 - TWISTED BALUSTER

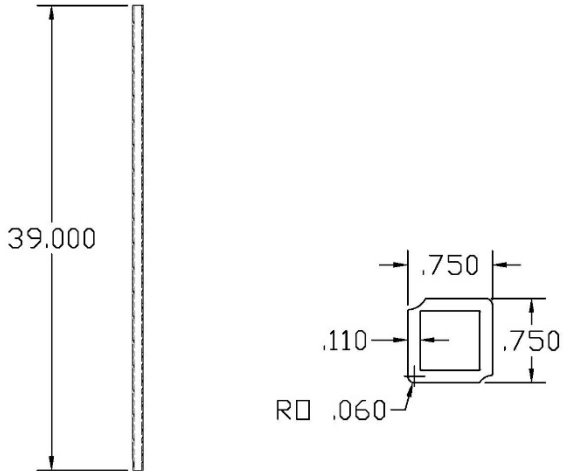


FIGURE 15 - HAMMERED BALUSTER

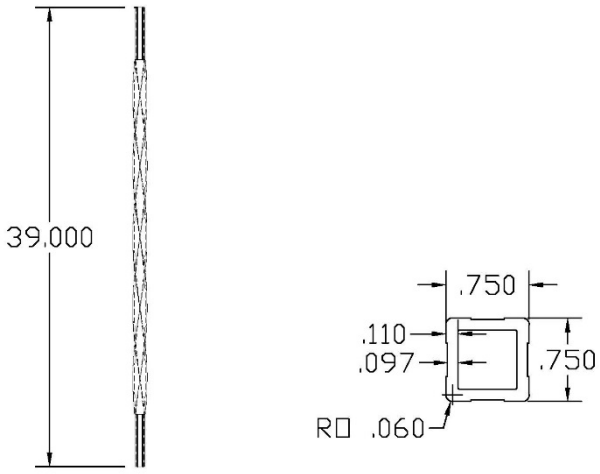


FIGURE 16 - TWISTED AND INDENTED BALUSTER

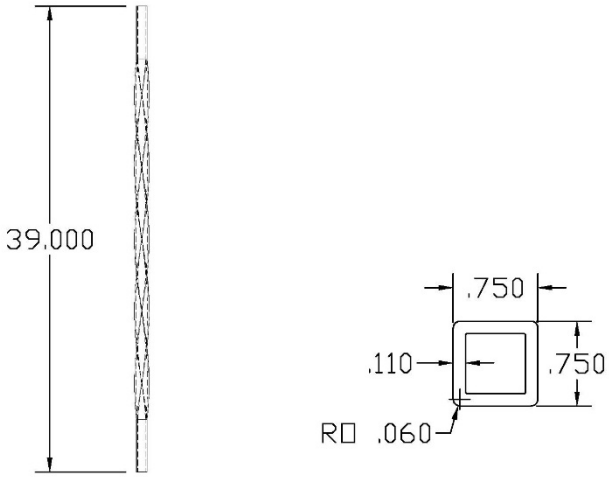


FIGURE 17 - HAMMERED AND TWISTED BALUSTER

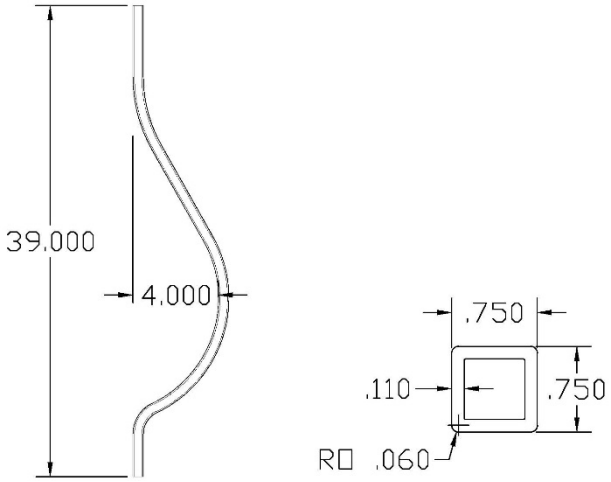


FIGURE 18 - 4 IN. BELLY BALUSTER

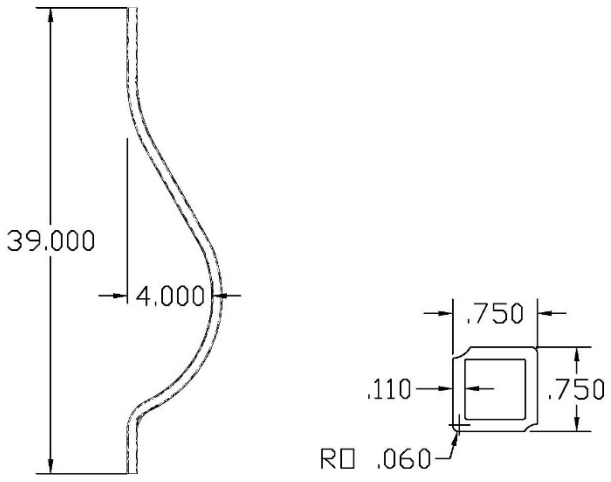


FIGURE 19 - 4 IN. HAMMERED BELLY BALUSTER

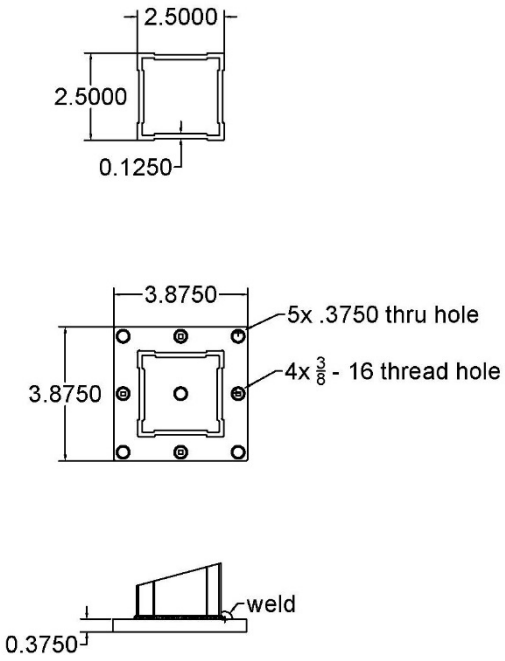


FIGURE 20 - 2.5 IN. WELDED POST

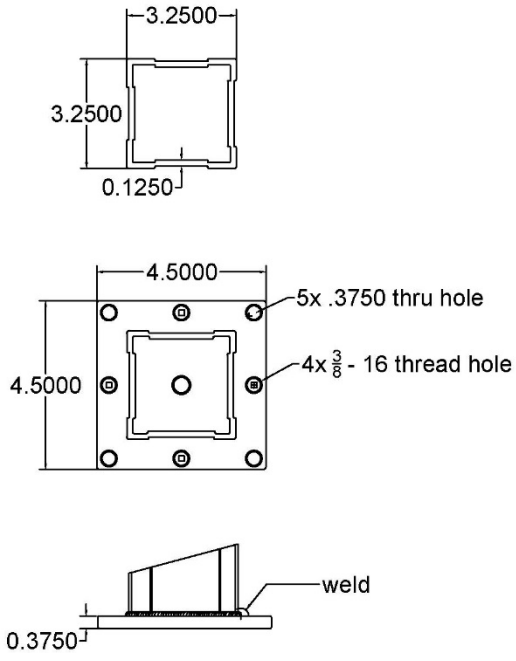


FIGURE 21 - 3.25 IN. WELDED POST

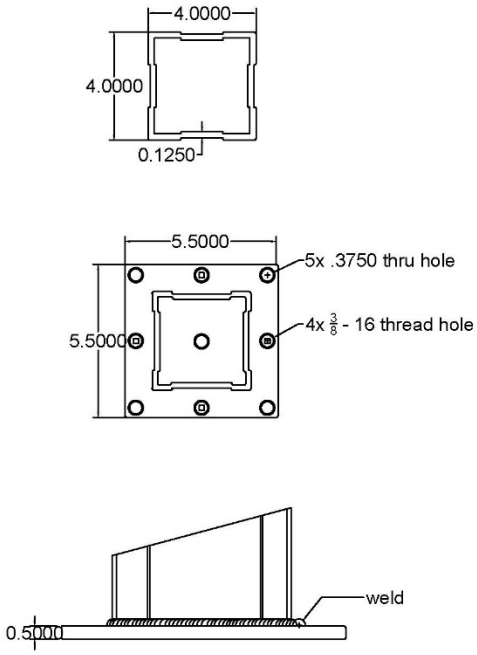


FIGURE 22 - 4 IN. WELDED POST