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DIVISION: 05 00 00 METALS

Section: 05 52 00 – Metal Railings

REPORT HOLDER:

FORTRESS IRON, LP DBA FORTRESS BUILDING PRODUCTS
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REPORT SUBJECT:

Fortress Vertical Cable Railing
Fortress Horizontal Cable 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)

1.2 *Fortress Vertical and Horizontal Cable Railing* has been evaluated for the following properties:

- Structural Performance

1.3 *Fortress Vertical and Horizontal Cable Railing* has been evaluated for the following uses:

- The *Fortress Vertical and Horizontal Cable Railing* as described in this report are guardrails (guards) under the definitions of the referenced codes and are intended for use on elevated walking areas such as decks, balconies and porches. See Table 1 for qualified guardrail dimensions.

2.0 STATEMENT OF COMPLIANCE

2.1 *Fortress Vertical and Horizontal Cable Railing* complies 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 *Fortress Vertical and Horizontal Cable Railing* systems are pre-assembled steel railing systems consisting of galvanized formed steel rails, pickets, and posts. The system consists of the following components:

3.1.1 The top and bottom rails for vertical assemblies are a two-piece assembly consisting of 1-1/4" high by 1-1/4" wide by 0.160" wall U-shaped bend steel section (outside member) and a 7/16" high by 7/8" wide by 0.075 wall U-shaped bent steel (inside member). Horizontal assemblies consist of only the U member. See Figure 1.

3.1.2 Infill may consist of vertical or horizontal stainless steel cable and steel balusters. The cables are of 1/8" diameter, 1x19, 316 stainless steel.

3.1.2.1 Vertical cables are installed at 3-1/4" on center with 5/8" diameter steel balusters spaced no greater than 31-1/4" on center along the length of the rail. The ends of the steel balusters include internal threading for attachment to the rail using a 5/16"-20 by 1-1/8" hex head stainless bolts. See Figures 3 through 5.

3.1.2.2 Horizontal cables are spaced every 3.6" to 3.77" depending on railing height with one 0.5" square hollow vertical midline support. The support is fitted with an internally threaded cap for installation to the top and bottom rails. See figures 6 through 7.

3.1.3 Top and bottom rails are connected to posts using steel mounting brackets. See Figure 2.

3.1.4 The railings are attached to either conventional 4 x 4 wood supports or steel posts. Steel post options include:

3.1.4.1 Square steel tube, 2" by 0.098" thick wall. The tube is connected to a 4" by 6mm thick square base via a 3/16" continuous fillet weld. The base plate has four 0.39" diameter holes for anchor bolts. See Figure 9.



3.1.4.2 Square steel tube, 3" by 0.075" thick wall. The tube is connected to a 5.12" by 7.6mm thick square base plate via a 1/4" continuous fillet weld. The base plate has four 1/2" diameter holes for anchor bolts. See Figure 8.

4.0 PERFORMANCE CHARACTERISTICS

4.1 The *Fortress Vertical and Horizontal Cable Railing* systems described in this report has demonstrated the capacity to resist the design loads specified in Chapter 16 of the IBC, as well as Section R301 of the IRC when tested in accordance with ICC-ES AC273. See Table 1 for maximum guardrail dimensions and code occupancy classifications.

5.0 INSTALLATION

5.1 General:

Fortress Vertical and Horizontal Cable Railing 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 *Fortress Vertical and Horizontal Cable Railing* is a pre-assembled steel railing system.

5.2.2 Top and bottom rails are secured to steel posts or conventional wood posts with metal brackets and carbon steel screws. Wood posts or other wood supporting structure shall have a specific gravity of 0.55 or greater (Southern Yellow Pine or better) and a minimum thickness to allow full penetration of the mounting screws. Rail attachment shall be in accordance with Table 2.

5.2.3 The steel posts shall be anchored to a concrete, steel or, wood deck with four 3/8" approved anchor bolts. The type and length of the anchor bolts is dependent upon the material and condition of the supporting structure and is not within the scope of this report. See Section 6: Conditions of Use for additional requirements.

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 The *Fortress Vertical and Horizontal Cable Railing* described in this Research Report complies with, or is a suitable alternative to, what is specified in those Codes listed in Sections 1.0 and 2.0 of this report, subject to the following conditions:

6.2.1 Conventional wood supports for guardrails, including posts 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. Supports and framing must provide suitable material for anchorage of the rail brackets and supports, respectively. Where required by the building official, engineering calculations and details shall be provided.

6.2.2 Anchorage of the structural steel 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:

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

6.2.2.2 The anchors must be stainless steel, galvanized steel, or other material compatible with the steel posts.

6.2.2.3 The anchor bolts must have a minimum diameter of 3/8" and utilize flat washers. The type and length of the anchor bolts is dependent upon the material and condition of the supporting structure and is not within the scope of this report.

6.2.2.4 For installation on wood decks, anchorage shall be made to structural framing. Anchorage to decking alone is not permitted.

6.2.3 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.

6.2.4 Any component or configuration not identified in this report has not been evaluated for performance and/or compliance to the referenced codes. Identification of such components with the CCRR program mark and/or number is prohibited.





6.2.5 Compatibility of fasteners and other installation hardware with the supporting construction, including treated wood, is not within the scope of this report.

6.2.6 Only those types of fasteners and fastening methods described in this report have been evaluated for the installation of the railing systems described herein; other methods of attachment are outside the scope of this report.

6.3 *Fortress Vertical and Horizontal Cable Railing* is manufactured by Fortress Railing Products under a quality program with inspections by Intertek Testing Services NA, Inc.

7.0 SUPPORTING EVIDENCE

7.1 Manufacturer's drawings and installation instructions.

7.2 Reports of testing and engineering analysis 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.

7.4 Intertek Listing Report "[Fortress Vertical and Horizontal Cable Railing](#)" on the [Intertek Directory of Building Products](#).

8.0 IDENTIFICATION

Fortress Vertical and Horizontal Cable Rails are identified with the manufacturer's name (Fortress Railing Products), the product name (*Fortress Vertical or Horizontal Cable Railing*), the phrase "For Use in One- and Two-Family Dwellings Only" where applicable, the Intertek Mark as shown below, the Intertek Control Number, the Code Compliance Research Report number (CCRR-0248), and the following statement: "See CCRR-0248 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.

This Code Compliance Research Report ("Report") is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this Report. Only the Client is authorized to permit copying or distribution of this Report and then only in its entirety, and the Client shall not use the Report in a misleading manner. Client further agrees and understands that reliance upon the Report is limited to the representations made therein. The Report is not an endorsement or recommendation for use of the subject and/or product described herein. This Report is not the Intertek Listing Report covering the subject product and utilized for Intertek Certification and this Report does not represent authorization for the use of any Intertek certification marks. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek.





TABLE 1 – GUARDRAIL SYSTEMS AND CODE OCCUPANCY CLASSIFICATIONS

Maximum Guardrail Dimensions ⁽¹⁾	Type	Supporting Post	Code Occupancy Classification
93-3/4" x 42"	Vertical Cable	2" Square Steel Posts, 3" Square Steel Posts or, Conventional Wood Posts	IBC: All Use Groups And, IRC: One- and Two-Family Dwellings
93.5" x 42"	Horizontal Cable		

⁽¹⁾ Guardrails are qualified up to and including the listed maximum guardrail dimensions for use in the referenced Code Occupancy Classification. Guardrail lengths are actual railing lengths, i.e. clear space between supports for level rails. Guardrail height is walking surface to top of top rail.

TABLE 2 – FASTENING SCHEDULE

Connection	Fastener
Rail Bracket to Steel Post ⁽¹⁾	Vertical Cable: Two 12-24 by 3/4" (0.178 in minor diameter) thread-cutting, star-drive, stainless steel screws
	Horizontal Cable: Two 1/4" -20 x 0.75" T-25 thread-cutting, star drive stainless steel screws.
Rail Bracket to Wood Post	Two #12-10 by 2-1/2" (0.155 in minor diameter) Type A point, wood screws
Rail Bracket to Rail ⁽¹⁾	Vertical Cable: One #12-24 by 3/4" (0.178 in minor diameter) thread-cutting, star-drive, carbon steel screws (fastened on deck side of rail/bracket).
	Horizontal Cable: One 1/4" -20 x 0.75" T-25 Thread Cutting Flat Head Screws (fastened on deck side of rail/bracket).
Baluster to Top / Bottom Rail	One 5/16-20 by 1-1/8" hex head stainless steel bolt
Vertical Cable Infill to Top Rail	Adjustable threaded cable clamp swage fitting with lock nut
Vertical Cable Infill to Bottom Rail	Stainless steel ball cable clamp swage fitting
Horizontal Cable	Cable Clamp and adjustable threaded swage at opposing ends.
Horizontal Cable Infill Mid Span Vertical Support to Rails	M6 x 18 mm button head cap screw

⁽¹⁾ 3/16" diameter pre-drill

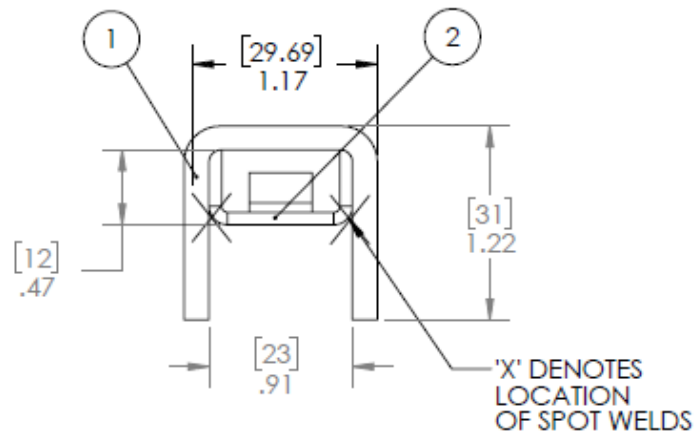


FIGURE 1: TOP AND BOTTOM RAIL ASSEMBLY

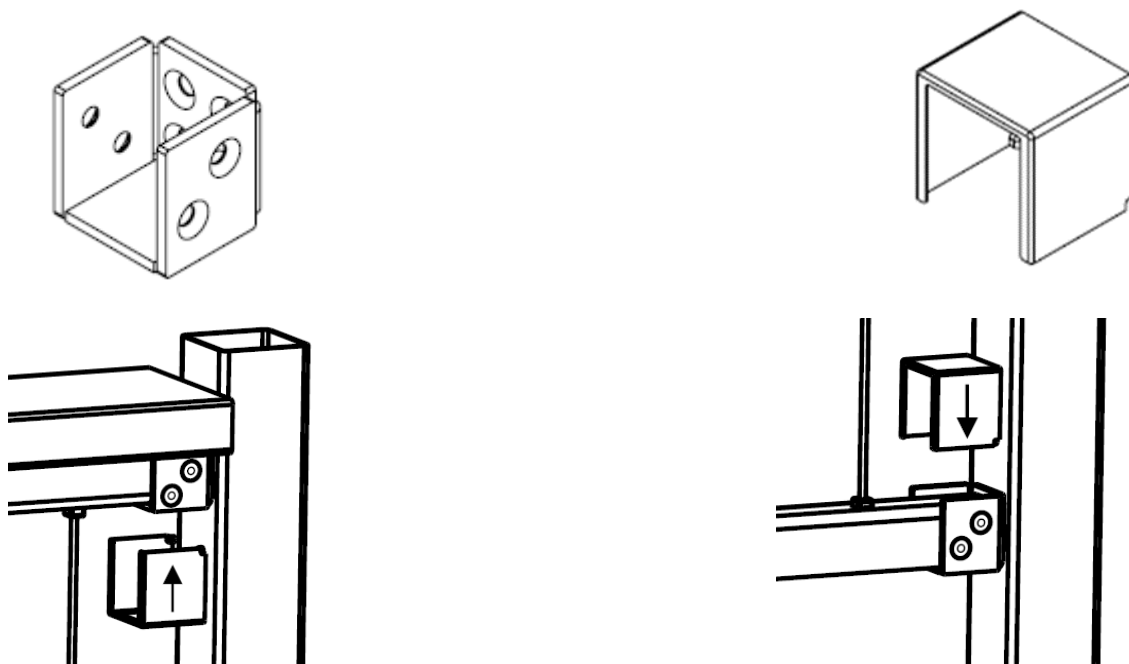


FIGURE 2: UNIVERSAL RAIL BRACKET AND ASSEMBLY

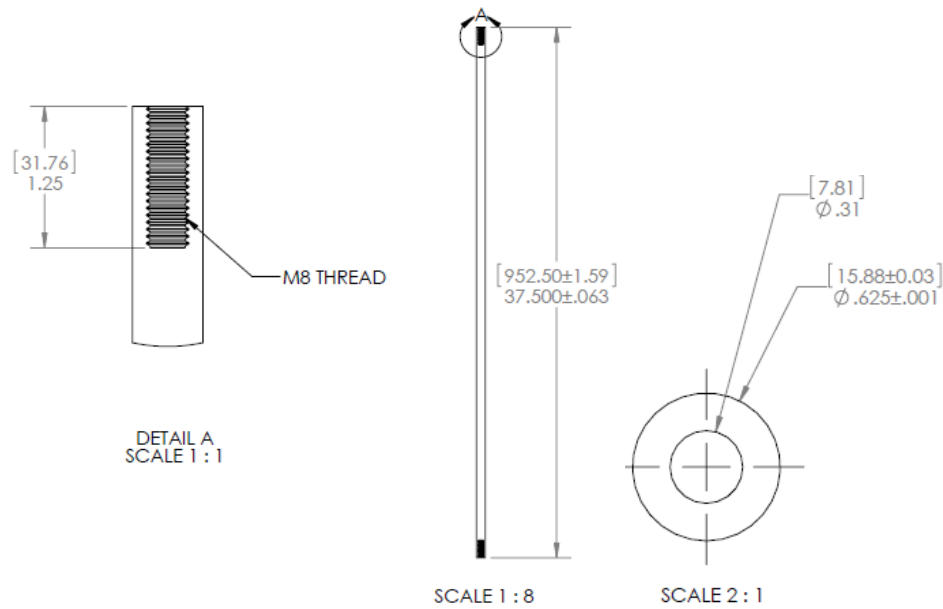
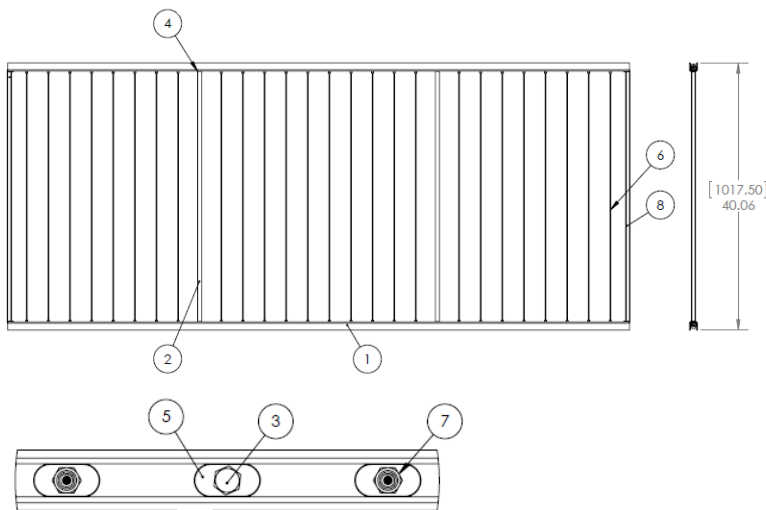


FIGURE 3: INTERNALLY THREADED BALUSTER FOR VERTICAL CABLE RAIL



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	R3331-00352	VERTICAL CABLE RAIL 93.5" WELDMENT	2
	R3331-00347	VERTICAL CABLE PANEL 93.5" RAIL	1
	R3331-00349	93.5" REINFORCING SPACER	1
2	R3331-00345	VERTICAL CABLE PANEL SPACER 40"	2
3	C9192-00198	M8 X 30MM HEX BOLT	4
4	C9193-01800	M8 NYLON WASHER	4
5	R3339-01601	NYLON WASHER SLEEVE INSERT	56
6	R3333-02752	40" VERTICAL CABLE SWAGE ASSEMBLY	26
	R3333-00343	1 X 19 STAINLESS STEEL CABLE 40"	1
	R3333-00200	STAINLESS STEEL BALL CABLE CLAMP	1
	R3333-00201	ADJUSTABLE SWAGE CABLE CLAMP	1
7	C9194-00168	M8 X 1.25" THREAD NYLON INSERT HEX LOCK NUT	26
8	R3339-02755	CR 40" PANEL RAIL SUPPORT ASSEMBLY	2
	R3339-02750	CR 40" PANEL RAIL SUPPORT TUBE	1
	R3339-02753	CR PANEL RAIL SUPPORT C CLIP	2

FIGURE 4: VERTICAL CABLE RAILING ASSEMBLY

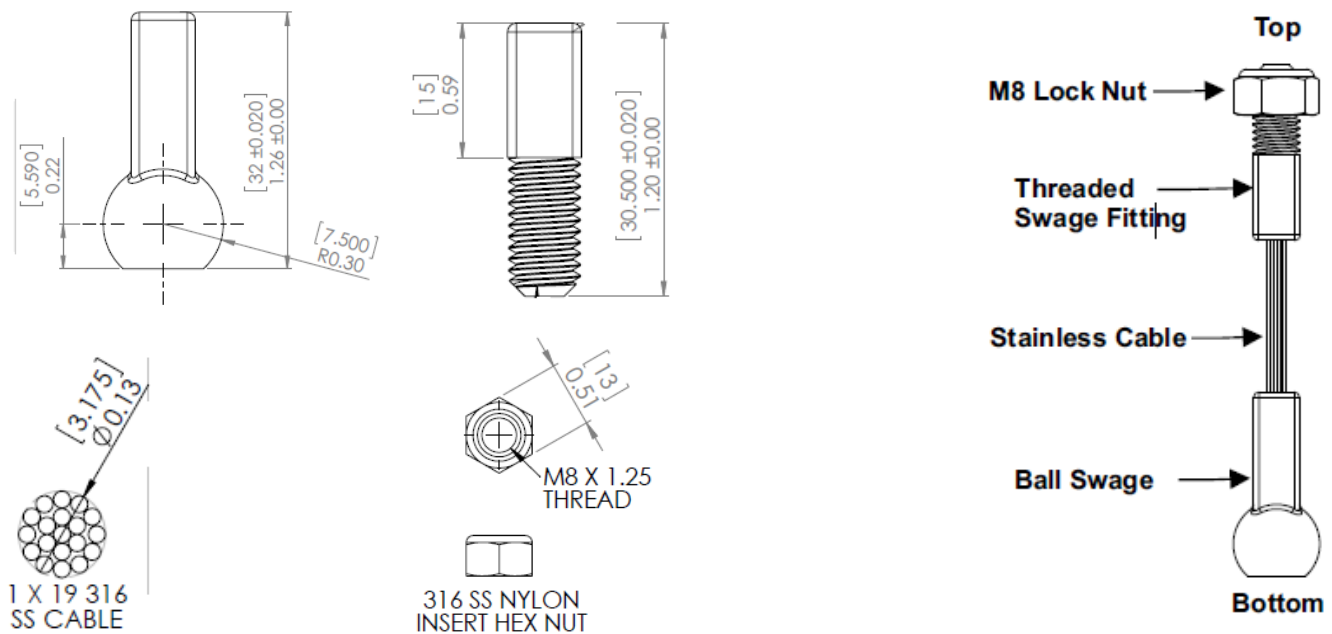


FIGURE 5: VERTICAL CABLE RAILING COMPONENTS

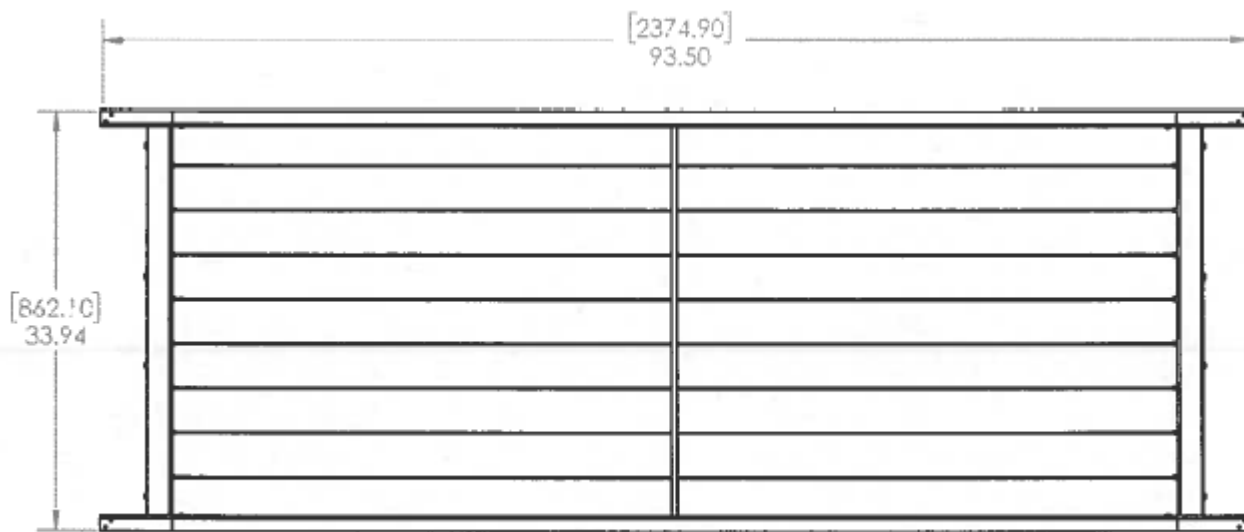
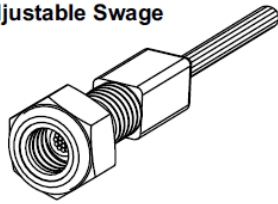
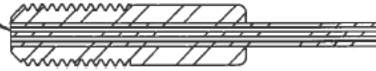


FIGURE 6: HORIZONTAL CABLE RAILING ASSEMBLY

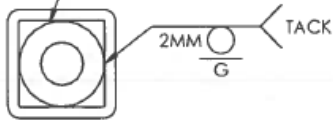
Adjustable Swage



CABLE IS EVEN WITH
ADJUSTABLE SWAGE
CABLE CLAMP

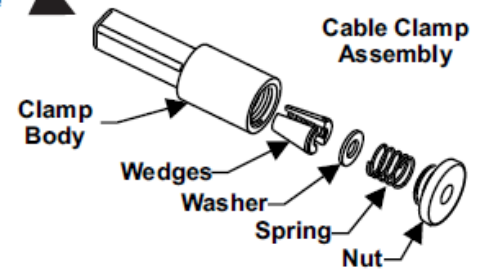


THREADED INSERT IS FLUSH
WITH THE END OF THE SUPPORT



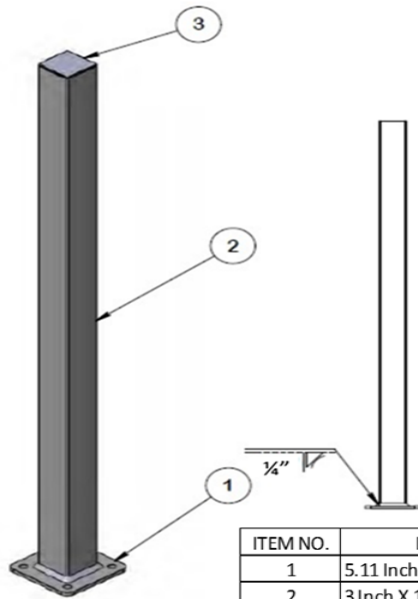
Vertical Midline Support Threaded Insert

Insert Cable
This End

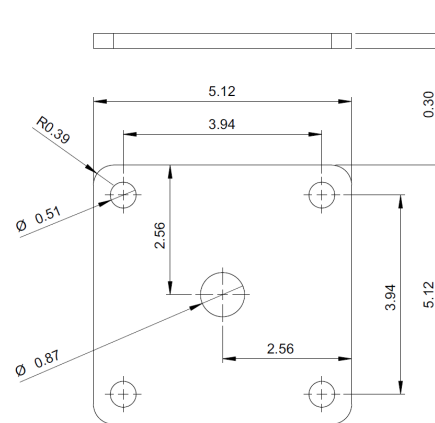


Cable Clamp Assembly

FIGURE 7 - HORIZONTAL CABLE RAILING COMPONENTS



ITEM NO.	DESCRIPTION	QTY
1	5.11 Inch X 7.5mm Base Plate	1
2	3 Inch X 1.8mm Tube	1
3	3 Inch Nylon Cap	1



Post Assembly

Base Plate

FIGURE 8 - 3" STEEL POST

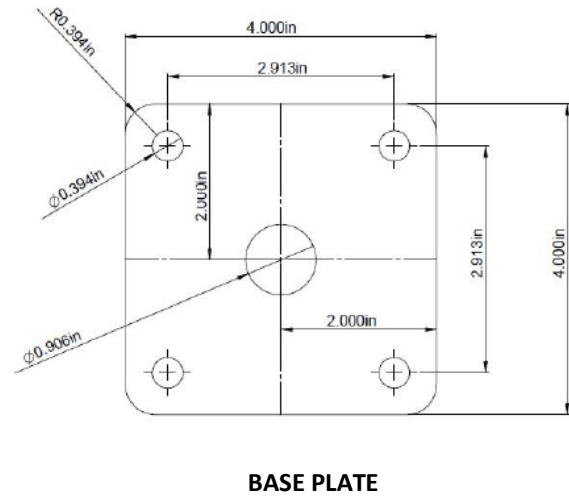
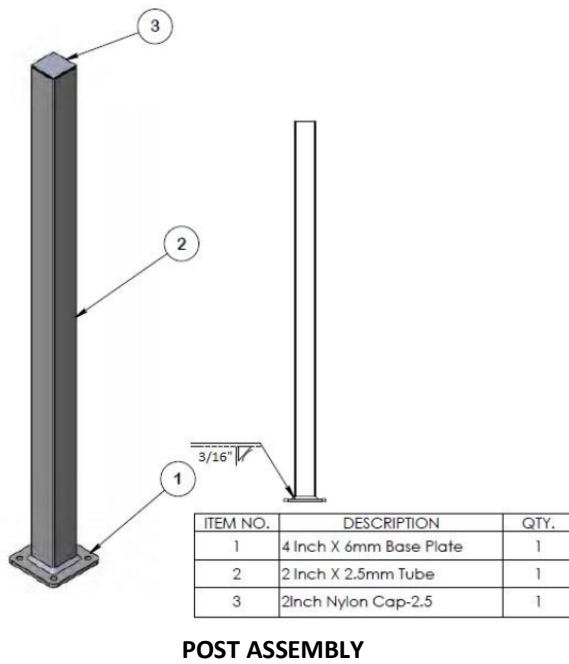


FIGURE 9 - 2" STEEL POST