

# ICC-ES Evaluation Report


**ESR-4615**

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<p><b>DIVISION: 05 00 00—METALS</b></p> <p><b>Section: 05 50 00—Metal Fabrications</b></p>	<p><b>REPORT HOLDER:</b> <b>ARC &amp; GAUGE LLC</b></p>	<p><b>EVALUATION SUBJECT:</b> <b>CORELINE FIXED COLUMNS; CORELINE ADJUSTABLE COLUMNS; AND CORELINE POST AND PAD COLUMNS</b></p>	
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## 1.0 EVALUATION SCOPE

**Compliance with the following codes:**

- 2021, 2018 and 2015 [International Building Code® \(IBC\)](#)
- 2021, 2018 and 2015 [International Residential Code® \(IRC\)](#)

**Properties evaluated:**

- Structural

## 2.0 USES

Coreline Fixed, Adjustable, and Post and Pad Columns are prefabricated steel column assemblies used as structural members to transfer axial compressive loads from beams to supporting members (e.g., foundation).

Coreline columns may be used under the IBC; and under the IRC when an engineered design is prepared in accordance with IRC Section R301.1.3.

## 3.0 DESCRIPTION

### 3.1 General:

Coreline Fixed Columns are assemblies comprised of round steel tube with flat plates fillet welded to both ends (see [Figure 1](#)). Fixed Columns have been evaluated for lengths ranging from 6 feet (1829 mm) to 12 feet (3658 mm).

Coreline Adjustable Columns are assemblies comprised of round steel tube with a flat plate fillet welded to one end and an adjustable screw jack assembly connected to the other end of the tubing (see [Figure 2](#)). The screw jack assembly is comprised of a collar, a screw, and a swivel plate. The screw fits in the swivel plate at one end and is screwed to the collar at the other end. The collar is butt welded to the end of the steel tube. Coreline Adjustable Columns have been evaluated for lengths ranging from 6 feet to 12 feet and 4 inches (1829 to 3759 mm).

Coreline Post and Pad Column is an assembly that can be cut down to desired length at the bottom end of the tube. The column is comprised of a round steel tube, an adjustable screw jack assembly on the top, and a bottom plate with a 3 inch-long (76 mm) pipe welded in the center of the plate. The column’s tube slides in the bottom pipe and both are tightened together by a set screw (see [Figure 3](#)).

The screw jack assembly in Coreline Adjustable Columns and Coreline Post and Pad Columns allows the column to be adjusted up to 4 inches (102 mm) in length.

### 3.2 Steel Tube:

Steel tubes are available in three sizes: 3" X 11 GA, 4" X 11 GA, and 3" X SCH 40. [Table 1](#) includes dimensions and design thicknesses of the tubes.

The 3" X 11 GA and 4" X 11 GA steel tubes conform to ASTM A513 Grade 1008 or 1010 with a minimum yield strength of 30 ksi (207 MPa). The 3" X SCH 40 steel tube conforms to ASTM A500 Grade B or C with a minimum yield strength of 42 ksi (290 MPa).

The tubes for the Coreline Adjustable and Fixed Columns are powder coated on the outside. The tubes for the Coreline Post and Pad Columns are powder coated on the outside or galvanized (inside and outside).

### 3.3 End Plates

#### 3.3.1 Flat Plates:

The top and bottom flat plates depicted in [Figures 1](#) and [2](#) are shown in detail in [Figure 4](#). The plates are manufactured from ASTM A1011 CS Type B Steel with a minimum yield strength of 40 ksi (276 MPa) and a minimum thickness of 0.17 inches (4.32 mm), unless otherwise specified.

The plates are available in three different styles: simple flat plate; flat plate with two straps [minimum thickness of straps is 0.12 inches (3.05 mm)] that are spot welded to it; and H-shaped plate that is stamped out with straps in one piece as shown in [Figure 4](#). The H-shaped plate has a minimum thickness of 0.12 inches (3.05 mm). The straps welded to the flat plate and the straps of H-shaped plates are intended to be wrapped around the supported member (e.g., beam).

#### 3.3.2 Swivel Plates:

The swivel plate depicted in [Figure 2](#) for the Adjustable Columns is shown in detail in [Figure 5](#). The swivel plate (C Chanel) depicted in [Figure 3](#) for Post and Pad Columns is shown in detail in [Figure 6](#). All swivel plates are manufactured from ASTM A1011 CS Type B steel with a minimum yield strength of 40 ksi (276 MPa) and a minimum thickness of 0.17 inches (4.32 mm).

#### 3.3.3 Base Plate of Post and Pad Column:

The base (bottom) plate of Post and Pad Column is  $\frac{3}{8}$  x 14 x 14 inch (9.53 x 356 x 356 mm) as shown in [Figure 7](#) and is manufactured from ASTM A1018 SS, minimum Grade 40 carbon steel. The 3-inch-long pipe welded to the base plate is Schedule 40 [0.216-inch thick (5.5 mm)] ASTM A500 Grade B or C carbon steel pipe with a minimum yield strength of 42 ksi (290 MPa). The pipe's external diameter is 3.5 inches for the 3" X 11 GA steel tube and 4 inches for the 3" X SCH 40 steel tube.

### 3.4 Collar:

The collar of the Adjustable and Post and Pad Columns is made from carbon steel ASTM A108/A576, Grade – 1117 with minimum yield strength and tensile strength of 58 and 69 ksi (400 and 475 MPa), respectively. The collar's internal threads, where the screw is installed, are 1 $\frac{1}{4}$ -7UNC Class 2B. For the 11 GA steel tube, the collar is  $\frac{3}{4}$ -inch thick (19 mm) and is available in two outer diameters, 3 and 4 inches (76 and 102 mm). For the SCH 40 steel tube, the collar is  $\frac{3}{4}$ -inch thick (19 mm) by 3  $\frac{1}{2}$ -inch (89 mm) outer diameter.

### 3.5 Screw:

The screw has a nominal length of 7 $\frac{1}{4}$  inches (184 mm) and a threaded length of 5 $\frac{1}{4}$  inches (133 mm). The screw's threads are 1 $\frac{1}{4}$ -7 UNC Class 2A. The unthreaded part has a flattened area to accommodate a wrench, which provides a method for column height adjustment. The screw is manufactured from ASTM F1554 minimum Grade 55 steel.

### 3.6 Weld:

The weld is Grade 70 with minimum size of 0.187 inches (4.75 mm). The steel tube and end plate are welded with two 1-inch (25.4 mm) lines of fillet weld. The collar and the steel tube are welded with three 0.5-inch (12.7 mm) lines of butt weld. The 3 inch-long (76 mm) pipe and base plate in the Coreline Post and Pad Column are welded with three 0.5-inch (12.7mm) lines of fillet weld.

## 4.0 DESIGN AND INSTALLATION

### 4.1 Design:

[Tables 2](#) through [4](#) include axial compression capacities of the Coreline columns for concentric loading and accidental eccentric loading conditions. The accidental eccentric loading condition is when the axial load is shifted a maximum distance of D/6 from the center of the column, where D is the outer diameter of the column.

The capacity of the end plates must be determined in accordance with applicable code.

#### 4.2 Installation:

Installation of the Fixed, Adjustable, and Post and Pad Columns must comply with this report, the report holder's published installation instructions and the approved plans. In the event of a conflict between the report holder's published installation instructions and this report, this report governs. The report holder's published installation instructions, engineering drawings, and approved plans must be available at the jobsite at all times during installation.

The columns must be placed vertically plumb in the desired position under the beam.

Fixed columns must be shimmed, if necessary, to ensure full contact between the top plate and supported member.

The Adjustable Columns may be installed with the adjustable screw assembly at either the top or bottom. Adjustable Columns must be adjusted to ensure full bearing of the beam on the top plate. The maximum adjustment length is 4 inches (102 mm). After the column has been adjusted to the desired length, one screw thread must be damaged to one half its depth for a length of 1½ inches (38 mm) with a cold chisel to prevent vertical movement of the column. The top plate must be attached to the supported beam in accordance with the approved plans.

Installation of the Post and Pad Column is similar to the Adjustable Column except that:

- The screw assembly is always installed at the top of the Post and Pad Column.
- The top plate of the Adjustable Column is replaced with a swivel plate and a channel for the Post and Pad Column.
- The bottom of Post and Pad Column's steel tube is inserted in the base plate's sleeve (pipe) and secured with a set screw.

Protection of the columns must be in accordance with IBC Section 2203 and IRC Section R407.2.

### 5.0 CONDITIONS OF USE:

The Coreline Fixed Columns, Adjustable Columns, and Post and Pad Columns described in this report comply with, or are suitable alternatives to what is specified in, those codes listed in Section 1.0 of this report, subject to the following conditions:

- 5.1 Where required by the code official, engineering calculations and construction documents consistent with this report must be submitted to the code official for approval. The documents must address details of the attachment of the column to the 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.
- 5.2 Loading on the columns must be limited to axial compressive loads, in accordance with Section 4.1. Other loading conditions, such as but not limited to, eccentric loads (except accidental eccentricity of D/6), tensile axial loads, bending loads, and lateral loads, are outside the scope of this report.
- 5.3 Connections of the column to the supporting member (e.g., foundation) and the column to the supported construction (e.g., beam), design of the supported construction, and design of the supporting members are outside the scope of this report and must be approved by the code official.
- 5.4 Maximum adjustment of Adjustable Columns and Post and Pad Columns is 4 inches (102 mm), and the overall column height must be limited to the maximum heights in [Tables 3](#) and [4](#).
- 5.5 Corrosion resistance of the Coreline columns is outside the scope of this evaluation report.
- 5.6 The columns are manufactured in Dundee, Ohio, under a quality control program with inspection by ICC-ES.

### 6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Adjustable Steel Columns \(AC335\)](#), dated February 2008 (editorially revised January 2021).

## 7.0 IDENTIFICATION

- 7.1 The ICC-ES mark of conformity, electronic labeling, or the evaluation report number (ICC-ES ESR-4615) along with the name, registered trademark, or registered logo of the report holder (Arc and Gauge LLC) must be included in the product label. [Electronic labeling is the ICC-ES web address ([www.icc-es.org](http://www.icc-es.org)); specific URL related to the report; or the ICC-ES machine-readable code placed on the aforementioned items.]
- 7.2 In addition, the columns are labeled with the product name and model, the length, and the design thickness (see [Table 1](#)).
- 7.3 The report holder's contact information is the following:

**ARC AND GAUGE LLC**  
**9151 TOWNSHIP ROAD 674**  
**DUNDEE, OHIO 44624**  
**(330) 359-0865**  
[www.corelineoh.com](http://www.corelineoh.com)  
[office@arcandgauge.com](mailto:office@arcandgauge.com)

TABLE 1—CORELINE’S TUBES SIZE

OUTSIDE DIAMETER (inch)	OUTSIDE DIAMETER (inch)	NOMINAL WALL THICKNESS (inch)	DESIGN THICKNESS (inch)
3" X 11 GA	3	0.120	0.114
3" x SCH 40	3.5	0.216	0.205
4" X 11 GA	4	0.120	0.114

For SI: 1 inch = 25.4 mm

TABLE 2—AXIAL COMPRESSION ALLOWABLE LOAD (ASD) AND DESIGN STRENGTH (LRFD) CAPACITIES OF FIXED COLUMNS (lbf)

Column Height	MODEL (Outer Diameter x Steel Tube Type)											
	3" x 11 GA				4" x 11 GA				3" x SCH 40			
	Concentric		Eccentric <sup>1</sup>		Concentric		Eccentric <sup>1</sup>		Concentric		Eccentric <sup>1</sup>	
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
6'-0"	13,810	21,140	9,670	14,710	20,510	31,380	14,010	21,310	21,110	31,670	21,110	31,670
6'-3"	13,560	20,750	9,540	14,520	20,300	31,060	13,910	21,160	21,110	31,670	21,110	31,670
6'-6"	13,300	20,350	9,410	14,330	20,090	30,730	13,810	21,010	21,110	31,670	21,110	31,670
6'-9"	13,040	19,950	9,280	14,120	19,860	30,390	13,700	20,850	21,110	31,670	21,110	31,670
7'-0"	12,770	19,540	9,140	13,920	19,640	30,050	13,590	20,680	21,110	31,670	21,110	31,670
7'-3"	12,500	19,120	9,000	13,700	19,410	29,690	13,480	20,520	21,110	31,670	21,110	31,670
7'-6"	12,220	18,700	8,860	13,490	19,170	29,330	13,370	20,340	21,110	31,670	21,110	31,670
7'-9"	11,940	18,270	8,710	13,260	18,920	28,950	13,250	20,160	21,110	31,670	21,110	31,670
8'-0"	11,660	17,840	8,560	13,030	18,680	28,580	13,130	19,980	21,110	31,670	21,110	31,670
8'-3"	11,380	17,410	8,410	12,800	18,430	28,190	13,000	19,790	21,110	31,670	21,110	31,670
8'-6"	11,090	16,970	8,250	12,560	18,170	27,800	12,870	19,590	21,110	31,670	21,110	31,670
8'-9"	10,810	16,530	8,090	12,320	17,910	27,400	12,740	19,400	21,110	31,670	21,110	31,670
9'-0"	10,520	16,090	7,930	12,080	17,650	27,000	12,610	19,190	21,110	31,670	21,110	31,670
9'-3"	10,230	15,660	7,760	11,830	17,380	26,590	12,470	18,980	21,110	31,670	21,110	31,670
9'-6"	9,950	15,220	7,600	11,580	17,110	26,180	12,330	18,770	21,110	31,670	21,010	31,670
9'-9"	9,660	14,780	7,430	11,320	16,830	25,760	12,190	18,560	21,110	31,670	20,520	31,260
10'-0"	9,380	14,340	7,260	11,060	16,560	25,340	12,040	18,340	21,110	31,670	20,010	30,500
10'-3"	9,090	13,910	7,090	10,800	16,280	24,910	11,900	18,110	21,110	31,670	19,510	29,730
10'-6"	8,810	13,480	6,920	10,540	16,000	24,480	11,750	17,890	21,110	31,670	19,000	28,960
10'-9"	8,530	13,050	6,740	10,280	15,720	24,050	11,590	17,650	21,110	31,670	18,490	28,190
11'-0"	8,260	12,630	6,570	10,020	15,440	23,620	11,440	17,420	21,110	31,670	17,980	27,410
11'-3"	7,980	12,210	6,400	9,750	15,150	23,180	11,280	17,180	21,110	31,670	17,470	26,630
11'-6"	7,710	11,800	6,220	9,490	14,870	22,750	11,120	16,940	20,950	31,670	16,960	25,850
11'-9"	7,440	11,390	6,050	9,220	14,580	22,310	10,960	16,700	20,180	30,870	16,440	25,080
12'-0"	7,180	10,990	5,870	8,950	14,290	21,870	10,800	16,450	19,410	29,700	15,930	24,300

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lbf = 4.4 N.

<sup>1</sup>The eccentric capacity was determined at an eccentricity, e, of 1/6 the column's outer diameter (measured from the center of the column).

- For 3" x 11 GA, e = 1/2 inch.
- For 4" x 11 GA, e = 2/3 inch.
- For 3" x SCH 40, e = 0.583 inch.

**TABLE 3—AXIAL COMPRESSION ALLOWABLE LOAD (ASD) AND DESIGN STRENGTH (LRFD) CAPACITIES OF ADJUSTABLE COLUMNS (lbf)**

Column Height <sup>1</sup>	MODEL (Outer Diameter x Steel Tube Type)											
	3" x 11 GA				4" x 11 GA				3" x SCH 40			
	Concentric		Eccentric <sup>2</sup>		Concentric		Eccentric <sup>2</sup>		Concentric		Eccentric <sup>2</sup>	
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
6'-4"	13,470	20,620	9,500	14,460	19,750	29,620	13,880	21,110	19,750	29,620	19,750	29,620
6'-7"	13,210	20,220	9,370	14,260	19,750	29,620	13,770	20,950	19,750	29,620	19,750	29,620
6'-10"	12,950	19,810	9,230	14,060	19,750	29,620	13,670	20,790	19,750	29,620	19,750	29,620
7'-1"	12,680	19,400	9,100	13,850	19,560	29,620	13,560	20,630	19,750	29,620	19,750	29,620
7'-4"	12,400	18,980	8,950	13,630	19,330	29,570	13,440	20,460	19,750	29,620	19,750	29,620
7'-7"	12,130	18,550	8,810	13,410	19,090	29,200	13,330	20,280	19,750	29,620	19,750	29,620
7'-10"	11,850	18,130	8,660	13,190	18,840	28,830	13,210	20,100	19,750	29,620	19,750	29,620
8'-1"	11,570	17,700	8,510	12,960	18,590	28,450	13,090	19,910	19,750	29,620	19,750	29,620
8'-4"	11,280	17,260	8,350	12,720	18,340	28,060	12,960	19,720	19,750	29,620	19,750	29,620
8'-7"	11,000	16,820	8,200	12,480	18,080	27,670	12,830	19,530	19,750	29,620	19,750	29,620
8'-10"	10,710	16,390	8,040	12,240	17,820	27,270	12,700	19,330	19,750	29,620	19,750	29,620
9'-1"	10,420	15,950	7,870	11,990	17,560	26,860	12,560	19,120	19,750	29,620	19,750	29,620
9'-4"	10,140	15,510	7,710	11,740	17,290	26,450	12,430	18,910	19,750	29,620	19,750	29,620
9'-7"	9,850	15,070	7,540	11,490	17,020	26,040	12,280	18,700	19,750	29,620	19,750	29,620
9'-10"	9,560	14,630	7,370	11,240	16,740	25,620	12,140	18,480	19,750	29,620	19,750	29,620
10'-1"	9,280	14,200	7,200	10,980	16,470	25,190	11,990	18,260	19,750	29,620	19,750	29,620
10'-4"	9,000	13,770	7,030	10,720	16,190	24,770	11,850	18,040	19,750	29,620	19,340	29,480
10'-7"	8,720	13,340	6,860	10,460	15,910	24,340	11,700	17,810	19,750	29,620	18,830	28,700
10'-10"	8,440	12,910	6,690	10,190	15,630	23,910	11,540	17,580	19,750	29,620	18,320	27,930
11'-1"	8,160	12,490	6,510	9,930	15,340	23,470	11,390	17,340	19,750	29,620	17,810	27,150
11'-4"	7,890	12,070	6,340	9,660	15,060	23,040	11,230	17,100	19,750	29,620	17,300	26,370
11'-7"	7,620	11,660	6,160	9,400	14,770	22,600	11,070	16,860	19,750	29,620	16,790	25,590
11'-10"	7,360	11,260	5,990	9,130	14,490	22,160	10,910	16,620	19,750	29,620	16,270	24,820
12'-1"	7,100	10,860	5,810	8,870	14,200	21,720	10,740	16,370	19,150	29,300	15,750	24,030
12'-4"	6,840	10,460	5,640	8,600	13,910	21,280	10,580	16,120	18,380	28,120	15,230	23,230

For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lbf = 4.4 N.

<sup>1</sup>The given height of the column includes the maximum 4-inch projection of the screw assembly.

<sup>2</sup>The eccentric capacity was determined at an eccentricity, e, of 1/6 the column's outer diameter (measured from the center of the column).

For 3" x 11 GA, e = 1/2 inch.

For 4" x 11 GA, e = 2/3 inch.

For 3" x SCH 40, e = 0.583 inch.

**TABLE 4—AXIAL COMPRESSION ALLOWABLE LOAD (ASD) AND DESIGN STRENGTH (LRFD) CAPACITIES OF POST AND PAD COLUMNS (lbf)**

POST AND PAD COLUMN HEIGHT <sup>1</sup>	MODEL (Outer Diameter x Steel Tube Type)							
	3" x 11 GA				3" x SCH 40			
	Concentric		Eccentric <sup>2</sup>		Concentric		Eccentric <sup>2</sup>	
	ASD	LRFD	ASD	LRFD	ASD	LRFD	ASD	LRFD
3'-4"	16,060	24,580	10,720	16,300	19,750	29,620	19,750	29,620
5'-4"	14,460	22,130	9,980	15,180	19,750	29,620	19,750	29,620
7'-4"	12,400	18,980	8,950	13,630	19,750	29,620	19,750	29,620

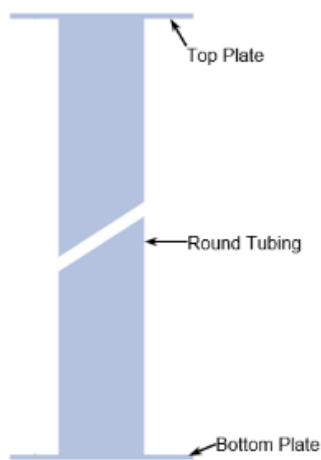
For SI: 1 inch = 25.4 mm, 1 foot = 305 mm, 1 lbf = 4.4 N.

<sup>1</sup>The given height of the Post and Pad Column includes the maximum 4 inch projection of the screw assembly.

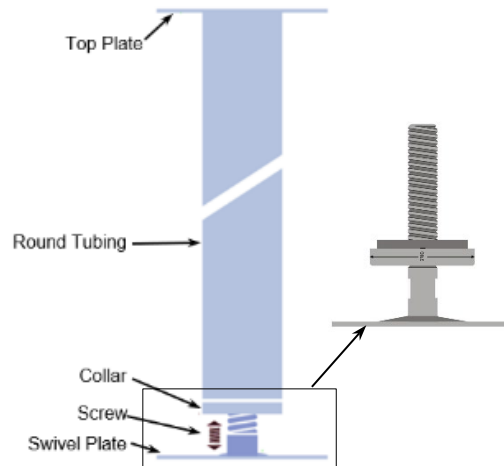
<sup>2</sup>The eccentric capacity was determined at an eccentricity, e, of 1/6 the column's outer diameter (measured from the center of the column).

For 3" x 11 GA, e = 1/2 inch.

For 3" x SCH 40, e = 0.583 inch.



**FIGURE 1—CORELINE FIXED COLUMN**



**FIGURE 2—CORELINE ADJUSTABLE COLUMN**

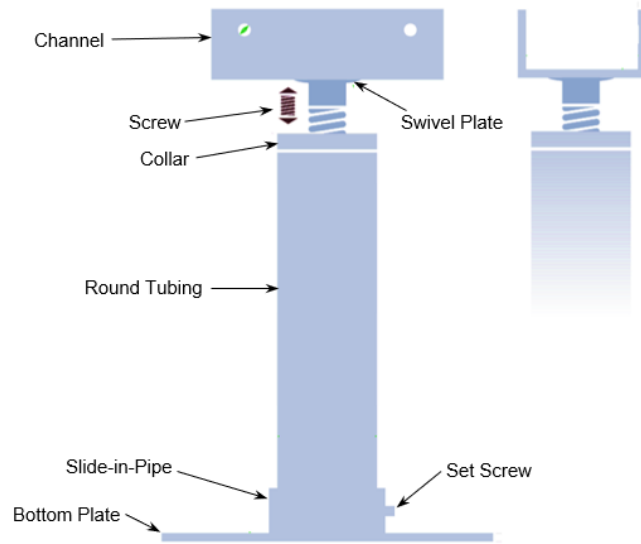
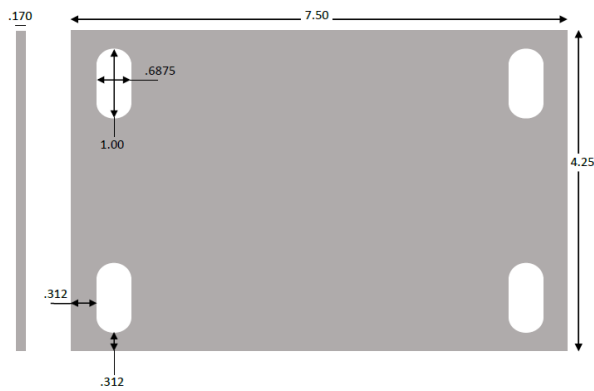
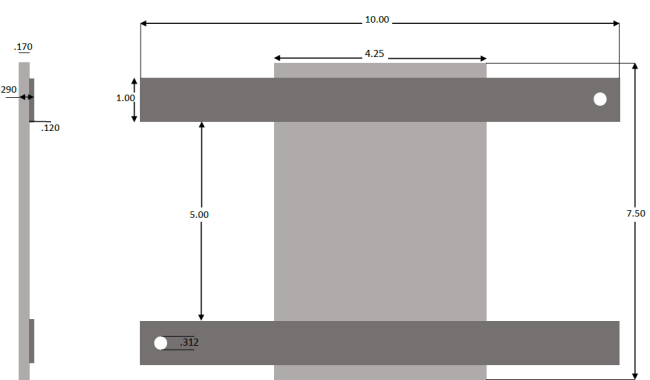


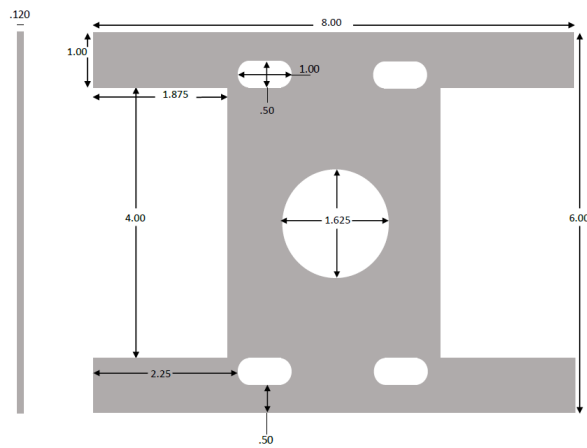
FIGURE 3—CORELINE POST AND PAD COLUMN



Simple Flat Plate



Flat Plate with Two Straps



H-Shaped Plate

FIGURE 4—END FLAT PLATES FOR CORELINE FIXED AND ADJUSTABLE COLUMNS

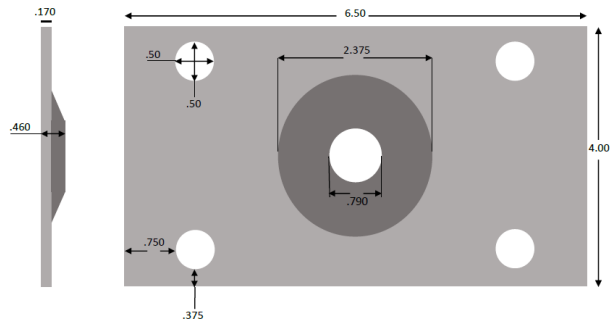


FIGURE 5—SWIVEL PLATE FOR CORELINE FIXED AND ADJUSTABLE COLUMNS

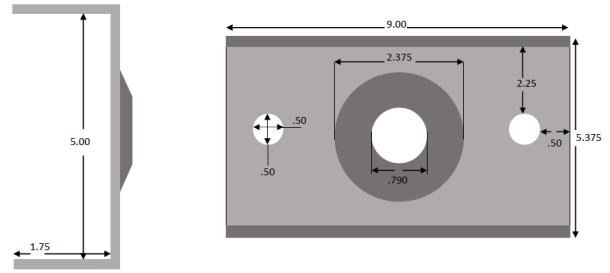


FIGURE 6—SWIVEL PLATE/C CHANNEL FOR CORELINE POST AND PAD COLUMNS

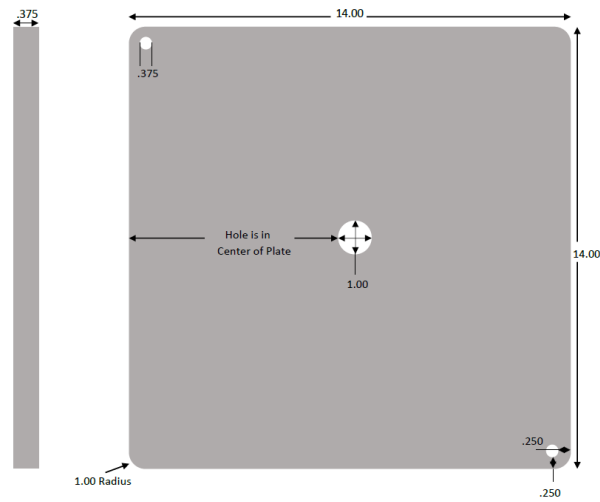


FIGURE 7—BASE PLATE FOR CORELINE POST AND PAD COLUMNS