



Date: July 22, 2024

Customer Name: Thomas Residence
Customer Address: 187 US HWY 441 N
Customer Number: Customer # 292580

To Whom It May Concern:

As part of the permit application for structural repairs, **Alpha Foundations, a Groundworks Company**, is providing engineering commentary relative to the proposed installation of floor supports for the above-referenced project. Alpha Foundations proposes installing **6 floor supports** at this property. Detailed information about the product and existing building structure are outlined in the attached report.

The purpose of the floor support products will be to stabilize the existing floor framing system by providing supplemental and/or permanent support to areas that are experiencing distress. Excavations will be performed for proposed footings as detailed on the subsequent pages of this report.

After completion of installation of the floor support products, if requested by the building official, we will evaluate and prepare a letter of completion for permit closeout.

The commentary provided herein is intended to provide guidance during the planning and installation phases of the project. The design follows ordinary engineering practice in the locality of the project and meets requirements of the current **Florida Building Code 2023, 8th Edition**.

Please feel free to call us if you have any questions or if we can be of any further assistance.

Respectfully,



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7/22/24

ANDREW D. THOMAS, P.E.
ENGINEER
ANDREW.THOMAS@GROUNDWORKS.COM
GROUNDWORKS COMPANIES, LLC

ATTACHMENTS:

ENGINEERING REPORT
DESIGN CALCULATIONS
GENERAL COMMENTARY
LOCATION/SITE PLAN

ENGINEERING REPORT FOR FLOOR STABILIZATION

BUILDING DEPT.: City of Lake City
205 N. Marion Ave
Lake City, FL 32055

REFERENCE CODE: FBC 2023, 8th Ed.

DATE: July 22, 2024

PROJECT: Thomas Residence
ADDRESS: 187 US HWY 441 N
CUSTOMER #: Customer # 292580

INSPECTOR: J. Clark

INSPECTION DATE: 7/9/2024



OVERVIEW:

As requested by the owner/representative of the above referenced project (client), the field inspector visited the project and performed a visual inspection of readily accessible foundation areas (walls and piers) and associated structural framing elements. Unless noted below, destructive testing and evaluation was not performed. Based on this inspection, the field inspector and the client agreed to the following "Scope-Of-Work".

SCOPE-OF-WORK: SettleStop Floor Support with FootingPad®

[SEE PRODUCT DETAILS - ATTACHED]

SCOPE-OF-WORK:

[SEE PRODUCT DETAILS - ATTACHED]

QUANTITY: 6 [SEE LOCATION PLAN FOR SPACING]

GENERAL ISSUE: Excessive deflection and sagging of main load beam in crawl space.

PROP. SOLUTION: Install floor supports with footings in crawl space, as shown on the attached sketch, to stabilize/level the floor framing system.

EXISTING STRUCTURE DETAILS:

- **Classification:** Single Family Residence
- **Stories:** 1
- **Construction Type:** Conventional Light Frame
- **Exterior:** Vinyl Siding
- **Foundation Type:** Crawl Space (Cast-In-Place w/ CMU or Brick Piers)
- **Floor Design Loads:**

Live Load:	40	psf
Dead Load:	15	psf

[Based on Typical FBC Load Tables]

SOIL CONDITIONS:

- **Assumed Allowable Bearing Capacity:** 1,500 psf Per Referenced Code Above



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DESIGN CALCULATIONS AND SUMMARY



BUILDING DEPT: City of Lake City
PROJECT: Thomas Residence
ADDRESS: 187 US HWY 441 N
DATE: July 22, 2024

TASK A: Evaluate Girder/Beam Loading and SettleStop Floor Support Loading:

STEP 1 - Determine the load which will be supported by the girder/beam in lbs per linear foot:

- Girder/Beam Load (plf) = [Span 1 (ft) + Span 2 (ft)] x Floor Load (psf) / 2
- Load = [3] + [9] x [55] / 2 = [330] plf [Girder/Beam Load]

STEP 2 - Determine the load on the SettleStop Floor Support by multiplying the calculated girder/beam load by the spacing of the SettleStop Floor Support:

- Girder/Beam Load (plf) x Maximum Average Support Spacing (ft) = SettleStop Floor Support Load (lbs)
- Load = [330] x [5] = [1,650] lbs [SettleStop Floor Support Load]
[±12in OK]

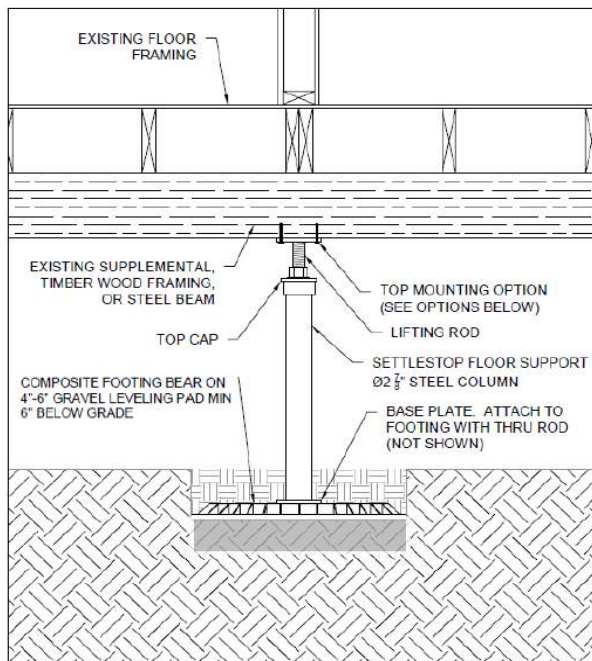
TASK B: Existing or new beam supported by existing supports and supplemental Settlestop Floor Supports (as shown on plan) is acceptable as per IRC girder/beam tables. **OK**

TASK C: Evaluate FootingPad® Poly Base Capacity:

Soil Bearing Capacity (Allow.) = [1,500] psf
SettleStop Floor Support Max. Allowable Load = [4,013] lbs [per FootingPad® ICC ESR-2147 Table 1]
SettleStop Floor Support Load = [1,650] lbs **< 4,013 lbs - OK**

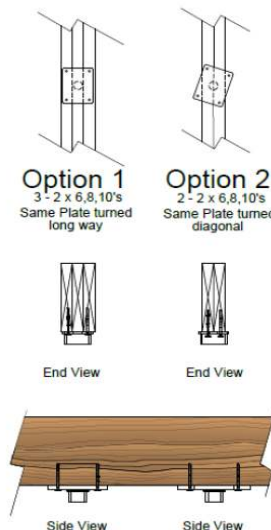
- NOTES:**
- Excavation to extend min. 6" below existing grade or to undisturbed soil, whichever is greater.
 - 2.5" thick X 24" diam. FootingPad® FP-24 footing placed directly on undisturbed soil.
 - 4" to 6" stone may be used to level bearing surface.

SettleStop Floor Support with FootingPad® Detail (On Soil):



Top Connection Options

Note: 90-degree mountable threaded stud (1/4"-20) w/ washer and 7/16" hex nut may be used for top connection to S4 beam



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COMMENTARY & LIMITATIONS

BUILDING DEPT: City of Lake City
PROJECT: Thomas Residence
ADDRESS: 187 US HWY 441 N
DATE: July 22, 2024



GENERAL COMMENTARY

The recommendations provided herein are based on our understanding of the project and subsurface characteristics at the time of this report. If differing project conditions are encountered, field personnel shall notify Engineering Department immediately for resolution.

LIMITATIONS

The intent of the proposed floor support products is to provide support to existing beams/girders or to provide support to new beams serving in a supplemental support condition (as noted herein).

It should be understood that one of the benefits of the floor support products is the adjustable bolts, which allows for minor and/or incremental adjustments over a period of time, which minimizes stress to the structure. Existing residential structures may be covered under the latest FBC Residential R301.3.

The information presented in this submittal is provided as support to the proposed scope of work outlined in the preceding pages. This report does not represent commentary on causation of foundation or structural damage (flood, wind, ground subsidence, etc.). Any additional work shall be considered beyond the scope of these analyses.

FLOOR SUPPORT PRODUCT REFERENCES:

- SettleStop Floor Support Groundworks Product Evaluation Report #1001
- ICC-ES Evaluation Report ESR-2147 (FootingPad®)

Additional Documents:



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LOCATION / LAYOUT PLAN / NOTES

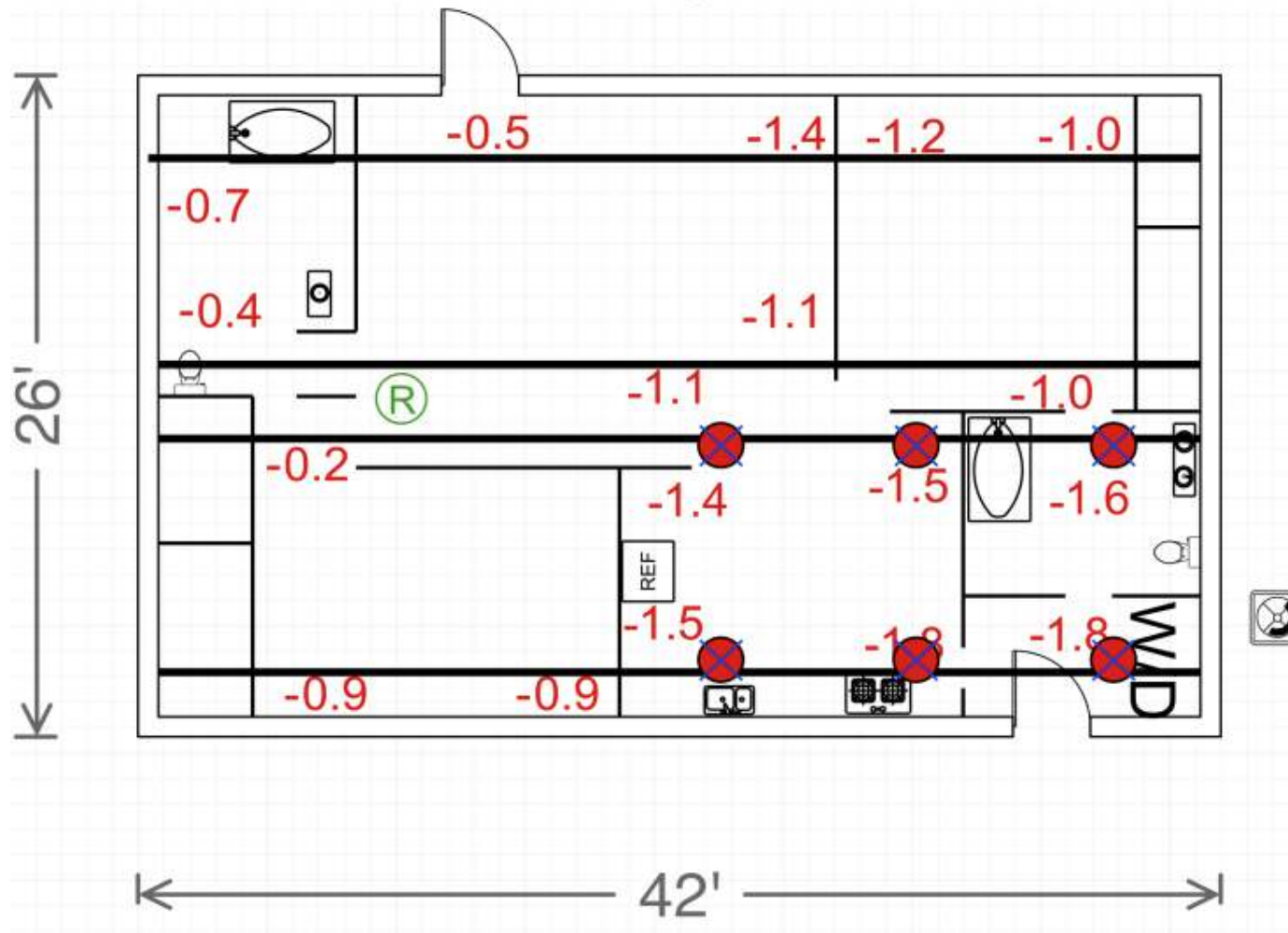
BUILDING DEPT.:

PROJECT:

ADDRESS:

DATE:

City of Lake City
Thomas Residence
187 US HWY 441 N
July 22, 2024



 Floor Support
Maximum Spacing 5' +/- 1'



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1. General Information

The SettleStop Floor Support System are steel column assemblies used to transfer axial compressive loads from wood or steel beams to a footing system. They may be used under the International Residential Code (IRC) when an engineering design is prepared in accordance with IRC Section R301.1.3.

2. Product Description

The SettleStop Floor Support System consists of a steel tube column with a bottom plate at one end and an adjustable bolt assembly at the other end. The adjustable bolt assembly consists of a collar plate that receives a threaded rod which is welded to the top plate. The threaded rod and top plate assembly are fastened to the collar plate using a hex nut. The SettleStop Floor Support System has been evaluated in nominal lengths up to 8 feet (2438.4 mm) and can be adjusted up to a maximum of 4 inches (101.6 mm) of extension as shown in Figure A-1. See Appendix A for details.

3. Component Description

3.1. Steel Tube: The steel tube has a 2-7/8" outside diameter (73.0 mm) and has a nominal thickness of 0.165" (4.2 mm). The tubing conforms to ASTM A500 Steel, Grade C with a minimum yield strength of 46 ksi (315 MPa) and a minimum tensile strength of 62 ksi (425 MPa). The tube material is galvanized using a three-coat inline process meeting ASTM 1057 with a minimum galvanized thickness of 0.85 to 1.19 mils (0.02 to 0.03 mm).

3.2. Base Plate Assembly: The base plate assembly consists of an ASTM A36 steel plate, 5" by 5" (127 mm by 127 mm), with a nominal thickness of 1/4" (6.3 mm); with a 1/4"-thick (6.3 mm) piece of 3.5" outside diameter (88.9 mm) ASTM A106 Grade C steel tube that is welded concentrically to the plate from the outside. The bottom plate has 4 holes at the corners and one hole in the center to accommodate footing anchor bolts. The base plate assembly has a rust-inhibitive coating. See Figure A-4 for details.

3.3. Threaded Rod and Top Plate Assembly: The threaded rod and top plate assembly consists of a 1-1/4" diameter (31.8 mm) by 6" (152.4 mm) long, ASTM F1554 steel Grade 55 threaded rod with matching 1-1/4" (31.8 mm) diameter UNC-7 ASTM A563, Grade A steel Heavy Hex Nut with a rust-inhibitive coating. The top plate consists of an ASTM A36 5" by 4" (127 mm by 101.6 mm) steel plate with a nominal thickness of 3/8" (9.5 mm), which is welded to the threaded rod. The top plate has 4 holes at the corners to accommodate fasteners into the supported beams. See Figures A-1 and A-3 for details.

3.4. Collar Plate Assembly: The collar plate assembly consists of an ASTM A36 4" by 4" (101.6 mm by 101.6 mm) steel plate with a nominal thickness of 3/8" (9.5 mm); with a 1/4"-thick (6.3 mm) piece of 3.5" outside diameter (88.9 mm) ASTM A106 Grade C steel tube that is welded concentrically to the plate from the outside. The collar plate assembly has a rust-inhibitive coating. See Figure A-2 for details.

4. Code Compliance

The strength design of the SettleStop Floor Support System complies with Section 301.1.3 of the 2015, 2018, and 2021 IRC by designing the components in accordance with accepted engineering practice and the applicable material codes (ANSI/AISC 360 – Specification for Structural Steel Buildings). Rust protection for the SettleStop Floor Support System complies with Section 407.2 of the 2015, 2018, and 2021 IRC.

5. Design Basis and Capacity

Finite Element Analysis (FEA) was performed for the threaded rod and top plate assembly to identify the buckling load. The top plate was fixed in all 6 degrees of freedom and the load exerted concentrically at the bottom of the 6" rod. To account for eccentricity, the complete tube and top connection was modeled considering that the collar plate assembly transfers shear loads, but not moment (rotationally free hinge). The top plate again was fixed and the bottom of the tube was pinned, while the tube-to-threaded stud connection was modeled as a perfect hinge. An eigenvalue analysis showed that buckling of the threaded rod is not the governing failure mode, considering a maximum of 0.5" of eccentricity. Finally, a stress analysis showed that the ultimate loads (i.e. 2 times the allowable loads shown in Table 1), does not cause any part of the entire SettleStop Floor Support System to reach their respective ultimate capacities.

The ANSI/AISC 360-22 was used for the evaluation of the column capacity for both the threaded rod and the tube. Based on Table B4.1a of the code, the tube is not locally slender hence flexural buckling would govern for both the rod and tube and the requirements of Chapter E3 were hence applied. The above-mentioned boundary conditions result in the unbraced factor (k) of 2.1 for the rod and 1 for the tube.

5.1. Design Capacities

TABLE 1 – LOAD CAPACITIES FOR SETTLESTOP FLOOR SUPPORT SYSTEM³

NOMINAL HEIGHT (inch) ¹	ALLOWABLE LOAD FOR ASD (lbf)	DESIGN STRENGTH FOR LRFD ² (lbf)
12 - 72	21,000	31,500
72 - 96	19,700	29,600

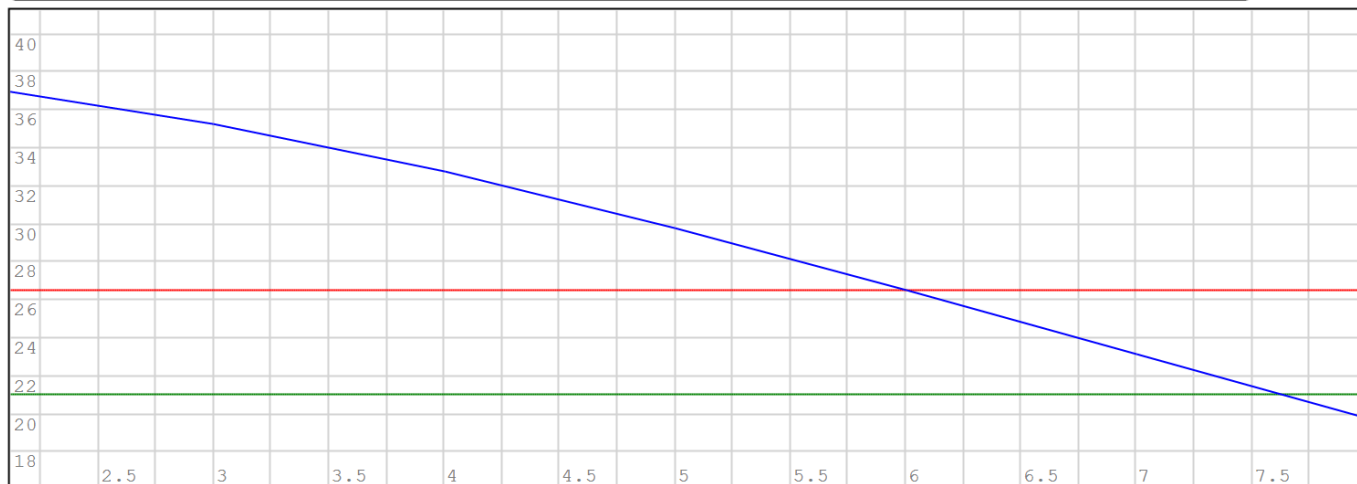
For SI: 1 inch = 25.4 mm, 1 lb. = 4.4 N

¹ Nominal size is the column length at its shortest adjustment.

² LRFD Design Strength values must be compared to factored loads.

³ Allowable loads are compressive axial loading. The SettleStop Floor Support System provides no lateral or axial tension capacity.

Length (ft) vs. Allowable Force (Kips) for Tube (Blue) and Rod (Red) and FEM-Allowable (Green)



5.2. Items Requiring Verification

The following items are related to the use and determination of code compliance for SettleStop Floor Support columns, but are not within the scope of this evaluation report:

- 5.2.1. Determination of loads imposed on the floor support system assembly.
- 5.2.2. Connections of the columns to the footing and supported structure. Top plate is assumed to be rotationally and translationally fixed. Base plate is assumed to be pinned. Top and bottom connection details should be such that these assumptions are satisfied.
- 5.2.3. Footing design and calculations for supporting the columns and imposed load.
- 5.2.4. Bearing capacity of the supported beam/member.

6. Installation and Use

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 the items in Section 5.2, 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. Installation of the SettleStop Floor Support System must comply with this report, any published installation instructions, and the approved plans. Some general installation details are shown in Appendix B.

SettleStop Floor Support System

- 6.1. The columns must be supported on code-complying foundations capable of supporting the imposed load.
- 6.2. The columns must be placed vertically plumb in the desired position.
- 6.3. The columns must be anchored to the foundation in accordance with the approved plans.
- 6.4. The columns must be adjusted to ensure full bearing of the beam on the top plate. The SettleStop Floor Support System can be adjusted up to a maximum of 4 inches (101.6 mm) of extension and the column height must be limited to the maximum height given in Table 1.
- 6.5. The top plate must be attached to the supported beam in accordance with the approved plans.

APPENDIX A
Component Details

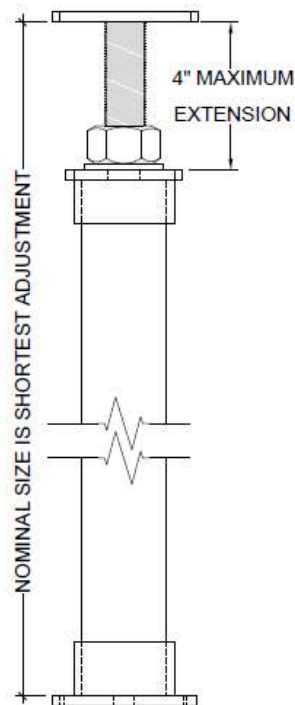


FIGURE A-1 – OVERALL SETTLESTOP FLOOR SUPPORT COLUMN ASSEMBLY

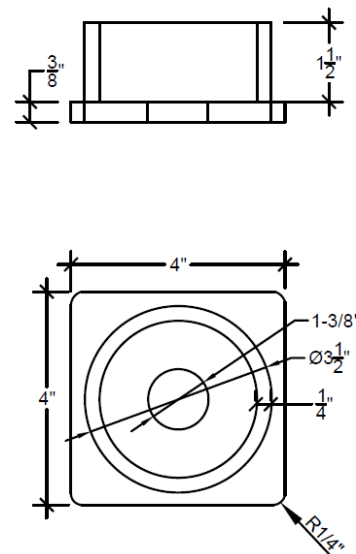


FIGURE A-2—COLLAR PLATE ASSEMBLY

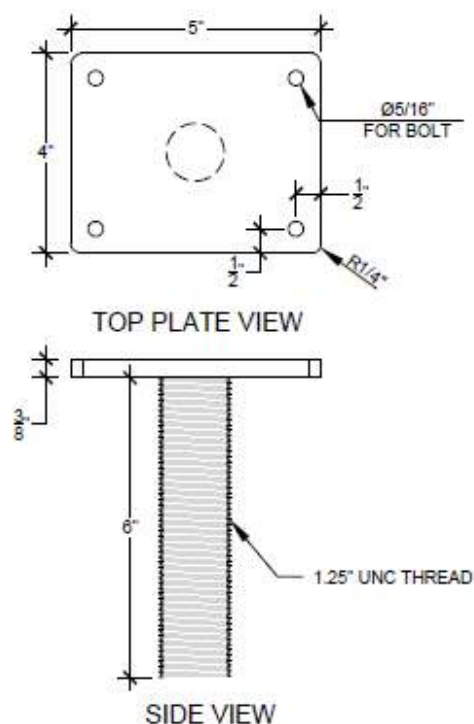


FIGURE A-3 – THREADED ROD AND TOP PLATE ASSEMBLY

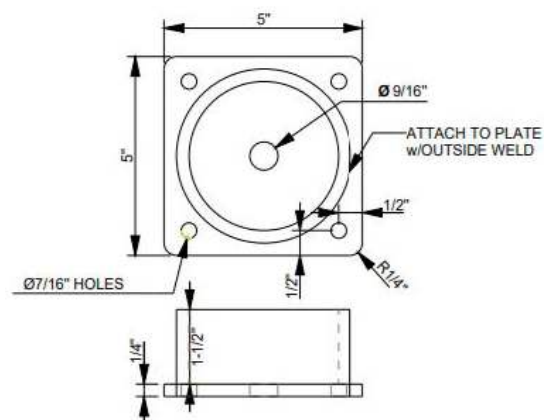
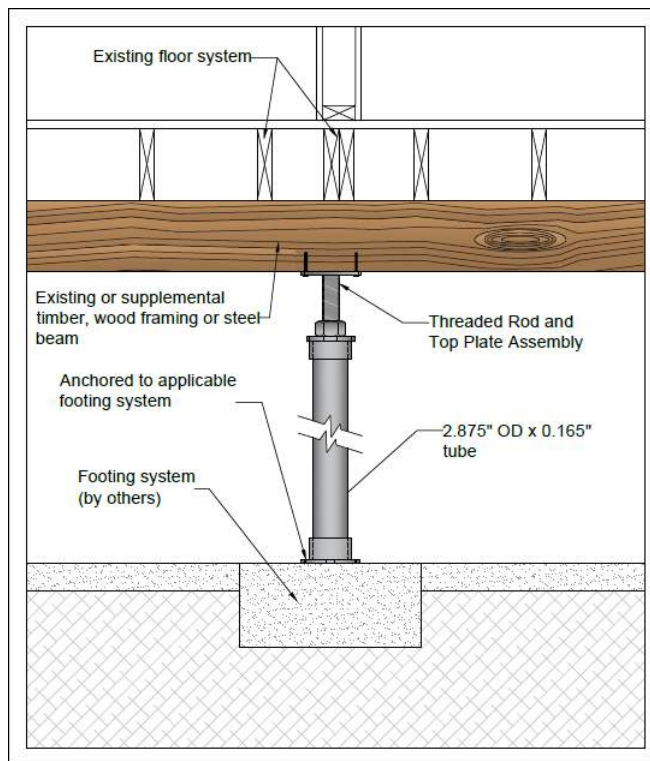


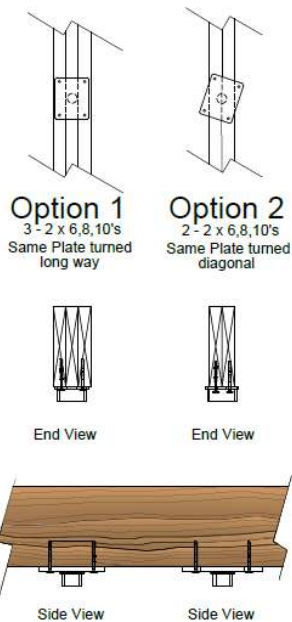
FIGURE A-4 – BASE PLATE

APPENDIX B

Installation Details



Top Connection Options



ICC-ES Evaluation Report

ESR-2147



Reissued May 2024

Subject to renewal May 2026

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<p>DIVISION: 31 00 00—EARTHWORK</p> <p>Section: 31 60 00—Special Foundations and Load-Bearing Elements</p>	<p>REPORT HOLDER:</p> <p>AG-CO PRODUCTS, INC.</p> 	<p>EVALUATION SUBJECT:</p> <p>AG-CO FOOTINGPAD® MODELS FP-10, FP-12, FP-16, FP-20 AND FP-24</p>	
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1.0 EVALUATION SCOPE

Compliance with the following codes:

- 2021, 2018, 2015, 2012, 2009, and 2006 [International Building Code® \(IBC\)](#)
- 2021, 2018, 2015, 2012, 2009 and 2006 [International Residential Code® \(IRC\)](#)

Properties evaluated:

- Structural
- Durability

2.0 USES

The AG-CO FootingPad® models FP-10, FP-12, FP-16, FP-20 and FP-24 are used as footings for the support of post columns in exterior locations or under-floor spaces in buildings of Type V construction under the IBC or any construction under the IRC. The FootingPad® post foundations are used as individual, isolated footings supporting gravity loads only.

3.0 DESCRIPTION

The AG-CO FootingPad® models FP-10, FP-12, FP-16, FP-20 and FP-24 are molded composite footings manufactured from a proprietary composite of engineered polypropylene and fiberglass. The FootingPad® post foundations are circular, ribbed-plastic pads formed by an injection molding process. See [Figures 1, 2, 3, 4](#) and [5](#) for dimensions and rib configurations.

4.0 DESIGN AND INSTALLATION

4.1 Design:

The FootingPad® post foundations are designed as shallow or surface rigid footings that transmit, uniformly to the supporting soil, the applied gravity load imposed by a minimum 3¹/₂-inch by 3¹/₂-inch (89 mm by 89 mm) post on the FP-10 pad, a minimum 3¹/₂-inch-by-3¹/₂-inch (89-mm-by-89-mm) post on the FP-12 pad, a minimum 4¹/₂ inch by 5¹/₂ inch (114 mm by 140 mm) post on the FP-16 pad, a minimum 4¹/₂ inch by 5¹/₂ inch (114 mm by 140 mm) post on the FP-20 pad and a minimum 4¹/₂-inch-by-5¹/₂-inch (114-mm-by-140-mm) post on the FP-24 pad. The posts must have a solid base bearing on the pads. Allowable loads are controlled by the type of supporting soil. The post foundations design load must not exceed the allowable gravity loads shown in [Table 1](#).

4.2 Installation:

The post location or spacing must be determined by the loads imposed on the FootingPad[®] post foundation and the allowable load for the specific type of soil (see [Table 1](#)). If in a post application, the post hole must be slightly larger than the post foundation diameter and deep enough to satisfy all design requirements. The bottom of the hole must be flattened and leveled to provide a uniform bearing surface for the FootingPad[®] post foundation. The FootingPad[®] post foundations must be placed into the hole with the flat side down. The footing must be tamped until level and stable in the bottom of the hole. The square-cut-post end must be positioned as close as possible to the center of the FootingPad[®] post foundation and the post must be plumbed. The dirt around the post must be placed in 12-inch lifts (30.5 cm), tamping each lift before more soil is added.

5.0 CONDITIONS OF USE:

The AG-CO FootingPad[®] models FP-10, FP-12, FP-16, FP-20 and FP-24 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 Installation must comply with this report, the applicable code and the manufacturer's published installation instructions. If there is a conflict between the manufacturer's installation instructions and this report, this report governs.
- 5.2 The FootingPad[®] post foundations are used to support post columns for Type V construction under the IBC or any construction under the IRC.
- 5.3 Exterior FootingPad[®] post foundations must be placed not less than 12 inches (305 mm) below the undisturbed ground surface (i.e. finished grade) in accordance with IBC Section 1809.4 and IRC Sections R403.1.4 and R507.3.2.
- 5.4 Exterior FootingPad[®] post foundations must be installed below the frost line of the locality unless protected from frost in accordance with IBC Section 1809.5 and IRC Sections R403.1.4.1 and R507.3.3. For installation in under-floor spaces such as crawl spaces in compliance with the IBC and IRC, the bottom of interior footings are permitted to be installed at finished grade unless otherwise required by IBC Section 1809.5 or IRC Section R403.1.4.1 for frost protection or by IBC Section 1805.1.2 or IRC Section R408.6 for surface or ground-water.
- 5.5 The FootingPad[®] post foundations must be used as individual isolated footings to resist bearing loads only and must not be used to resist lateral or uplift loads.
- 5.6 The design of the structure supported by the FootingPad[®] post foundations is outside the scope of this report.

6.0 EVIDENCE SUBMITTED

Data in accordance with the [ICC-ES Acceptance Criteria for Molded Plastic Footing Pads \(AC49\)](#), dated August 2013 (editorially revised May 2021).

7.0 IDENTIFICATION

- 7.1 Each FootingPad[®] post foundation must have a permanent label or etching including the name of the manufacturer, the model number and the evaluation report number (ESR-2147).
- 7.2 The report holder's contact information is the following:

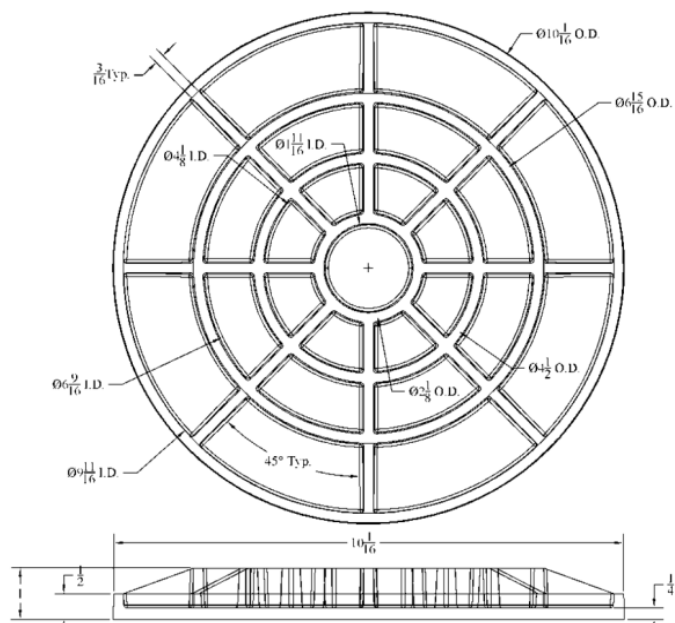
AG-CO PRODUCTS, INC.
400 CAROL ANN LANE
OSSIAN, INDIANA 46777
(800) 522-2426
www.footingpad.com

TABLE 1— FOOTINGPAD[®] POST FOUNDATION ALLOWABLE LOADS (POUNDS) RELATED TO LOAD-BEARING PRESSURES OF FOUNDATION MATERIALS

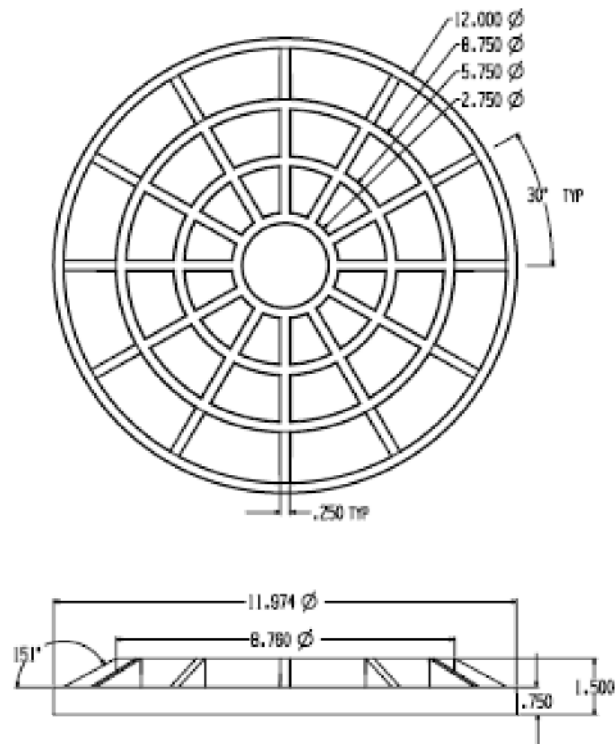
FOOTINGPAD [®] MODEL	PAD DIAMETER	LOAD-BEARING PRESSURES OF FOUNDATION MATERIALS ¹			
		1500 psf	2000 psf	2500 psf	3000 psf
FP-10	10 inch	810 lbs.	1081 lbs	1351 lbs	1622 lbs.
FP-12	12 inch	1126 lbs.	1536 lbs	1946 lbs	2356 lbs.
FP-16	16 inch	2009 lbs.	2739 lbs	3470 lbs	4200 lbs.
FP-20	20 inch	2687 lbs.	3973 lbs	5259 lbs	6545 lbs.
FP-24	24 inch	4013 lbs.	5784 lbs	7556 lbs	9327 lbs.

For SI: 1 inch = 25.4 mm; 1 lbf = 4.4 N; 1 lbf/ft² = 47.9 Pa.

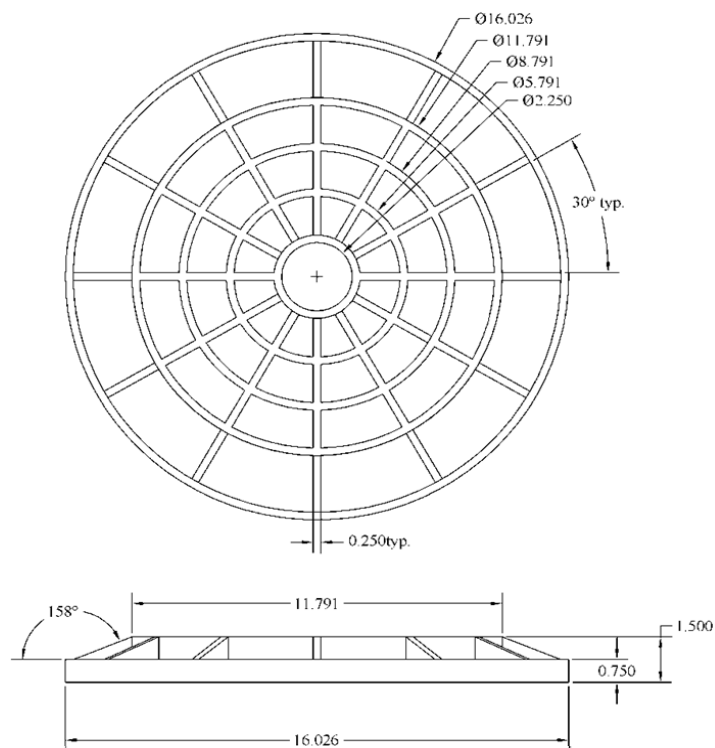
1. Load-bearing pressures of foundation materials shall be determined using the presumptive load-bearing values in IBC Table 1806.2 or IRC R401.4.1, as applicable, or the load-bearing values shall be determined with a site-specific soil investigation, as required by the code official.



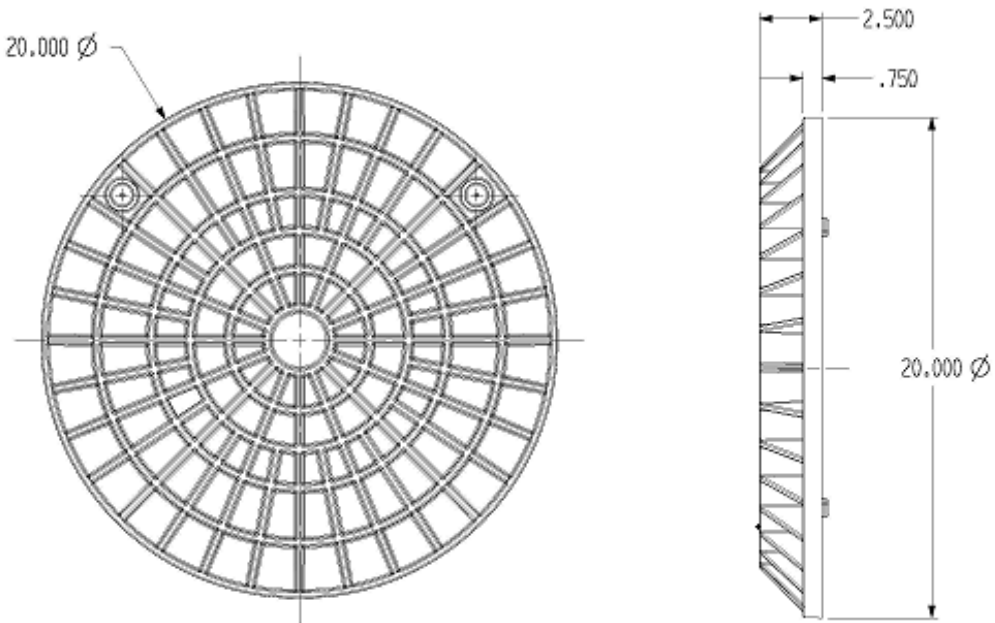
(All Dimensions in inches)
FIGURE 1—FP-10 FOOTINGPAD®



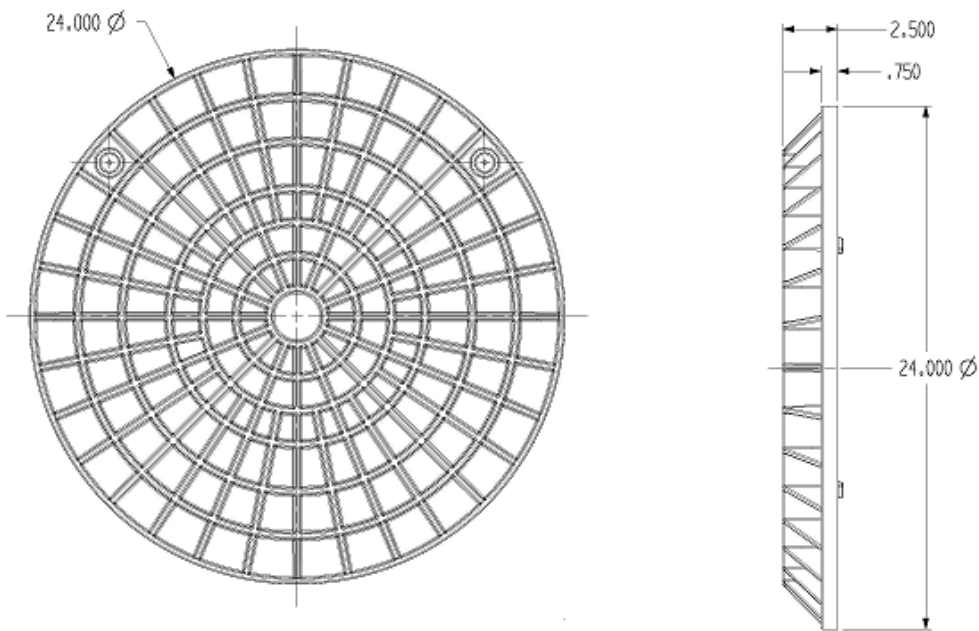
(All dimensions in inches)
FIGURE 2—FP-12 FOOTINGPAD®



(All Dimensions in inches)
FIGURE 3—FP-16 FOOTINGPAD®



(All Dimensions in inches)
FIGURE 4— FP-20 FOOTINGPAD®



(All Dimensions in inches)
FIGURE 5—FP-24 FOOTINGPAD®