

techno Metal Post



SECOND EDITION

SPEC BOOK
















HELICAL PILE FOUNDATIONS
















technoMetalPost
HELICAL PILE FOUNDATIONS



SPEC BOOK - Second Edition

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INTRODUCTION

ABOUT US

Techno Metal Post (TMP) was founded in Canada in 1993. Through the founders vision, dedication, and hard work, TMP has grown from a local family business to a worldwide network of more than 180 professionally trained and certified dealers. Along with this network expansion and progress, TMP has remained at the forefront of cutting-edge technology in the design and manufacturing of helical piles and installation equipment over 30 years. TMP helical piles are engineered and tested to the highest quality standards; guaranteed and proven to be durable even in the most challenging soil conditions. TMP designs and builds some of the most versatile, state-of-the-art proprietary installation equipment in the world. As a result of our innovative technology and our far-reaching network of dealers, TMP has quickly become the world leader in helical piles.

QUALITY MANUFACTURING PILES

Our TMP team is committed to purchasing North American steel for helical pile manufacturing. TMP helical piles are manufactured using structural steel according to ASTM A500 grade C, CSA G40.21-44W. They are also welded according to CSA W47.1 standard. They can be hot-dipped galvanized according to ASTM A123. The piles have been load tested according to ASTM standards in a variety of soil types around the world. Our piles are designed to resist axial, lateral, and bending moment loads. The use of the helix maximizes the load bearing capacity of soil.

CONNECTION SYSTEM

Different types of structures require different pile caps and brackets. For post structures like decks, we offer a variety of pile caps for standard dimensional lumber sizes. TMP has also developed new construction pile caps. We also offer a line of foundation repair brackets. TMP can also make custom brackets upon request, for special types of connections.

INSTALLATION EQUIPMENT

TMP recognizes that its investment in the production of its own line of equipment, for the sole purpose of installing helical piles, is one of many advantages over other companies. Because every helical pile project is different, TMP produces three machines varying in size, power, and capabilities; each of which is specially made for helical pile installations. Every machine is designed to deliver an accurate and reliable job and built to precisely measure the torque produced during the installation process. From this information, our certified installers know the allowable load capacities of each helical pile after its installation. TMP has developed machines of different sizes, performance levels, and capacities. Regardless of the machine used, they are all designed to perform rigorous and reliable work. Each model is equipped with a torque measurement system. Thanks to this information, our certified installers know the precise load-bearing capacity of each pile installed.

QUALITY MANUFACTURING BACKED BY INSTALLATION EXPERIENCE

Behind TMP's product quality, there is a quality control for the installation of the product as well. Professionally trained certified installers and highly specialized and skilled engineers ensure the proper installation of TMP's helical pile foundation system.

DEALER-INSTALLERS

New dealers and installers undergo thorough and substantial hands-on training, equipping them with the skills and knowledge to succeed in their projects. Over the past 30 years, our dealers and installers have completed over 3 million pile installations for projects throughout the world. They have installed helical piles in almost every soil type that exists throughout Canada, the United States, Europe, the Caribbean, French Polynesia and New Zealand.

ENGINEERING TEAMS

TMP's engineers are specialized in geotechnical and structural engineering and are here to assist and offer you personalized service – from small residential projects to large-scale industrial installations. Whenever you specify a helical pile foundation project, our engineers are available to assist in determining the proper helical piles to use for each of your projects and can issue a certificate and guarantee the work according to standards.

DISCLAIMER LIMITATION OF LIABILITY

GENERAL LIMITATIONS

The capacities of TMP manufactured products shown in this Spec Book are only indicative and provide a general guidance to the reader in order to help specify the appropriate product for their project and it is recommended to consult with our engineering department. Site specific conditions and engineering may reduce the capacities of the helical piles shown in this Spec Book.

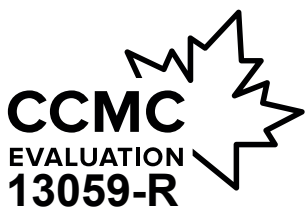
The capacities of helical piles are subject to a strict compliance with the installation procedure. Namely, the helical piles shall be installed to appropriate depth and soil bearing stratum.



CANADA CERTIFICATIONS

TECHNICAL CERTIFICATIONS - AN ASSURANCE OF QUALITY AND RELIABILITY

TMP has worked tirelessly to obtain the required accreditation and acceptance of its products throughout the world. Our engineers have spent countless hours ensuring that our products meet the strictest standards. TMP is the first helical pile company in the world to be recognized and to receive certifications from multiple countries.



CANADIAN CONSTRUCTION MATERIALS CENTRE (CCMC) EVALUATION REPORT CCMC 13059-R

In 2002 (and renewed in 2018), TMP received certification from the Canadian Construction Materials Centre (CCMC) attesting that Techno Pieux/TMP products comply with the requirements of the National Building Code of Canada (NBC).



ISO 9001 EVALUATION REPORT #481

ISO 9001:2015 specifies requirements for a quality management system when an organization:

- a) needs to demonstrate its ability to consistently provide products and services that meet customer and applicable statutory and regulatory requirements, and
- b) aims to enhance customer satisfaction through the effective application of the system, including processes for improvement of the system and the assurance of conformity to customer and applicable statutory and regulatory requirements.



CANADIAN WELDING BUREAU (CWB) CSA W47.1

TMP is also certified by the Canadian Welding Bureau in division 2.

WORLDWIDE CERTIFICATIONS



United States: TMP has received an evaluation report (ESR # 3418) from the ICC Evaluation Service (ICC-ES)



United States: Since 2018, TMP has been the first helical pile company in the world to receive the Uniform Evaluation Service (UES) ER-481 seal of approval.



France: Since 2006, TMP has been the first helical pile company to benefit from a technical assessment issued by the Commission Chargée de Formuler des Avis Techniques (CCFAT) N°3/16-873.



Europe: TMP was the first helical pile company to be certified as meeting the requirements of European standard EN 1090-1:2009 + A1:2011 / Execution of steel structures class 2, EN 1090-2.



United Kingdom: TMP is the first to receive the BBA Approval Certificate (Certificate 18/5477), which is recognized by building authorities, government departments, architects, designers and industry insurers.

SELECTION TABLE

MODEL (OUTSIDE, DIAMETER)	PROJECT TYPE	MAXIMUM BEARING CAPACITY								LATERAL CAPACITY ⁶		FACTORED BENDING RESISTANCE	
		COMPRESSION ^{1 2 4 5}				TENSION ^{1 3 4}				SLS		(LB-PI) (KN-M)	
		SLS ⁷		ULS ⁸		SLS ⁷		ULS ⁸					
		(LB)	(KN)	(LB)	(KN)	(LB)	(KN)	(LB)	(KN)	(LB)	(KN)		
P1 (O.D. 1.9 in / 48.3mm)	Light Residential (deck without roof, stairs, etc.)	6,800	30	9,520	42	3,400	15	4,760	21	500	2.2	1,010	1.4
P2 (O.D. 2.4 in / 60.3mm)	Medium Residential and Light Commercial (deck, carport, sunroom, single-story, re- sidential addition, etc.)	11,000	49	15,400	69	5,500	24	7,700	34	1,000	4.4	1,785	2.4
P2.5 (O.D. 2.875 in / 73mm)	Medium Residential and Light Commercial (deck, carport, sunroom, residential addition, sign, new construction, boardwalk, etc.)	20,000	89	28,000	125	10,000	44	14,000	62	1,500	6.7	4,057	5.5
P3 (O.D. 3.5 in / 88.9mm)	Heavy Residential, Light to Medium Commercial and Industrial (two storey residential addition, cottage, sign, light post, solar panel, new construc- tion, underpinning, boardwalk, tie-back, carport, etc.)	33,750	150	47,250	210	16,875	75	23,625	105	2,250	10	6,454	8.8
P4 (O.D. 4.0 in / 101.6mm)	Heavy Residential, Light to Medium Commercial and Industrial (cottage, sign, light post, solar panel, new construction, boardwalk, tie-back, bollard, etc.)	45,000	200	63,000	280	22,500	100	31,500	140	2,700	12	9,057	12.3
P3HD (O.D. 3.5 in / 88.9mm)	Heavy Residential, Light to Heavy Commercial and Industrial (new construction, underpinning, tie-back, etc.)	45,000	200	63,000	280	22,500	100	31,500	140	2,250	10	9,411	12.8
P4HD (O.D. 4.0 in / 101.6mm)	Heavy Residential, Light to Heavy Commercial and Industrial (new construction, underpinning, tie-back, etc.)	50,625	225	70,875	315	25,313	113	35,438	158	2,700	12	13,165	17.9
P5 (O.D. 5.6 in / 141.3mm)	Heavy Residential, Light to Heavy Commercial and Industrial (cottage, sign, light post, new construction, boardwalk, solar panel, bollard, retaining wall, etc.)	50,625	225	70,875	315	25,313	113	35,438	158	4,500	20	21,507	29.2
P6 (O.D. 6.6 in / 168.3mm)	Heavy Residential, Light to Heavy Commercial and Industrial (sign, light post, new construction, solar panel, bollard, retaining wall, etc.)	50,625	225	70,875	315	25,313	113	35,438	158	5,625	25	33,876	45.9

1. The bearing capacity values in the selection table are an indication and must be validated on-site according to the soil conditions encountered and the driving torque attained during installation.

2. The compression load capacity (SLS) is determined by the driving torque which is provided by the installation equipment when installing the piles.

3. The tension load capacity is obtained according to the driving torque which is attained during installation and according to the penetration depth of the pile. For tension applications, contact the TMP Engineering Department.

4. The maximum compression/tension loads presented in the selection table to limit the settlement to 12 mm (1/2 inch).

5. When the helical pile is laterally unsupported (very loose soil/soft, liquifiable soil, water and wind), the structural strength of the pile must be approved by the TMP Engineering Department.

6. The lateral capacity values are just indicative. They are based on dense granular soil, a free head condition of the pile, an above-ground height of the piles of 150 mm (6 inches) and with the application of only a lateral load. For applications with lateral loads, contact the TMP Engineering Department.

7. The compression load capacity (SLS) values are based on a minimum safety factor of 2 on the ultimate geotechnical resistance.

8. Factored ultimate geotechnical resistance at ULS.

Comments:

- For all technical questions, please contact the TMP Engineering Department at 418 338-8735, or via email at eng@technometalpost.com

- Larger diameter TMP piles can be used for applications requiring a lateral or bending resistance higher than shown in the selection table.

LIFESPAN EXPECTANCY

INTRODUCTION

TMP helical pile foundation capacities shown in this catalog include consideration for corrosion loss over the life of a typical structure. A typical structure's lifespan is assumed to be 50-75 years and soil corrosivity is assumed to be non-severe up to corrosive soil. Severely corrosive soil sites usually have one or more of the following conditions and require site-specific attention and design: soil resistivity < 1000 ohm-cm, soil PH < 5.5, high organic content soil, mine or landfill waste, soil sulfate concentrations > 1000 ppm, or helical pile foundations located in splash zones of water, especially saltwater. Corrosion loss is commonly accounted for by increased wall thickness, hot-dip galvanization, or a combination of these two techniques. Other corrosion protection systems that are available include sacrificial zinc or magnesium anodes electrically attached to the shafts and impressed current systems. Impressed current systems apply a dc voltage to the system of piles in-order-to interrupt the galvanic reaction and protect all the piles below grade.

CODE REQUIREMENTS

Building code requirements for required corrosion loss of steel piles varies. The United States model code (IBC 2021) is silent on corrosion loss for piles, the National Building Code of Canada (NBC 2015) states that corrosion protection must be provided when soil conditions are corrosive to steel but is silent on corrosion loss for piles. The Canadian Foundation Engineering Manual (CFEM 2006) refers to National Bureau of Standards Monograph 127 (1972) and Bjerrum (1967) in regard of detailed information on corrosion of steel piles. Transport Quebec (CCDG 2020) recommends 1.5 mm total loss, and the European Code (EN 1993-5:2007) recommends various corrosion rates depending on soil type. Other corrosion loss references include Helical Piles, A Practical Guide to Design and Installation, Howard A. Perko, PhD PE and the International Code Council – Evaluation Service, Acceptance Criteria for Helical Foundations ICC-ES AC358.

In the United States, it is common to design to ICC-ES AC358, which recommends a reduced design wall thickness (T_d) to account for corrosion loss. The loss of side wall thickness due to corrosion (T_s) is subtracted from the design wall thickness (T_n). T_s is obtained from the following equations where t equals the design life in years:

Zinc-coated steel: $T_s = 25 t 0.65$, (318 μ m or 0.013" at 50 years)

Bare Steel: $T_s = 40 t 0.80$, (914 μ m or 0.036" at 50 years)

In Canada, the recommended calculation method relating to the loss of thickness by corrosion is similar to that recommended by ICC-ES AC358. The calculation method uses a thickness T_s (thickness of sacrificial steel) based on a minimum service life of 50 years, i.e.:

Black steel (no protection): $T_s = 1.5\text{mm}$

Galvanized steel (per CSA G164): $T_s = 0.32\text{mm}$

Galvanized steel (per ASTM A123): $T_s = 0.36\text{mm}$

In Europe, EN 1993-5:2007 recommends atmospheric corrosion may be taken as 0.01 mm per year in normal conditions or 0.02 mm per year where marine conditions are applicable. Corrosion loss in soils, EN 1993-5:2007 presents the following Table 4-1 in soil and Table 4-2 in water

Recommended value of thickness loss (mm) due to corrosion for piles and sheet piles in soils, with or without groundwater

Required design working life	5 years	25 years	50 years	75 years	100 years
Undisturbed natural soils (sand, silt, clay, schist,...)	0.00	0.30	0.60	0.90	1.20
Polluted natural soils and industrial sites	0.15	0.75	1.50	2.25	3.00
Aggressive natural soils (swamp, marsh, peat,...)	0.20	1.00	1.75	2.50	3.25
Non-compacted and non-aggressive fills (clay, schist, sand, silt,...)	0.18	0.70	1.20	1.70	2.20
Non-compacted and aggressive fills (ashes, slag,...)	0.50	2.00	3.25	4.50	5.75

Notes

1. Corrosion rates compacted fills are lower than those in non-compacted ones. In compacted fills the figures in the table should be divided by two.
2. The values given for 5 to 25 years are based on measurements, whereas the other values are extrapolated.

Recommended value for the loss of thickness (mm) due to corrosion for piles and sheet piles in fresh water or in sea water

Required design working life	5 years	25 years	50 years	75 years	100 years
Common fresh water (river, ship, canal,...) in the zone of high attack (water line)	0.15	0.55	0.90	1.15	1.40
Very polluted fresh water (sewage, industrial effluent,...) in the zone of high attack (water line)	0.30	1.30	2.30	3.30	4.30
Sea water in temperate climate in the zone of high attack (low water and splash zones)	0.55	1.90	3.75	5.60	7.50
Sea water in temperate climate in the zone of permanent immersion or in the intertidal zone	0.25	0.90	1.75	2.60	3.50

Notes

1. The highest corrosion rate is usually found in the splash zone or at the low water level in tidal waters. However, in most cases, the highest bending stresses occur in the permanent immersion zone, see the table above.
2. The values given for 5 to 25 years are based on measurements, whereas the other values are extrapolated.

HOT DIP GALVANIZATION

TMP foundations can be hot-dipped galvanized to reduce corrosion loss and increase lifespan. Galvanization is performed per ASTM A123. Minimum galvanization thickness of TMP products is 75 µm or about 3 mils (530 g/m²). This zinc coating sacrifices itself and protects the base metal prolonging service life by about 15 years based on AASHTO and AC-358. Performance of hot-dipped galvanized steel in soil is summarized by Perko 2007.

OTHER GOOD PRACTICE RECOMMENDATIONS

When in doubt of the actual soil conditions on the project site, it is conservative to select hot-dipped galvanized steel products or use a cathodic protection system. Welds at couplings for hot-dipped galvanized steel shafts should have a coat of zinc-rich paint applied prior to advancing the coupling into the ground or be protected by a sacrificial zinc anode.

HELICAL PILES MODEL P1

Shaft

Wall Thickness	0.145" (3.68 mm)
Round HSS Outside Diameter	1.9" (48.3 mm)
Available Standard Lengths	5'-3" (1.6 m) / 7'-0" (2.1 m) / 10'-6" (3.2 m)

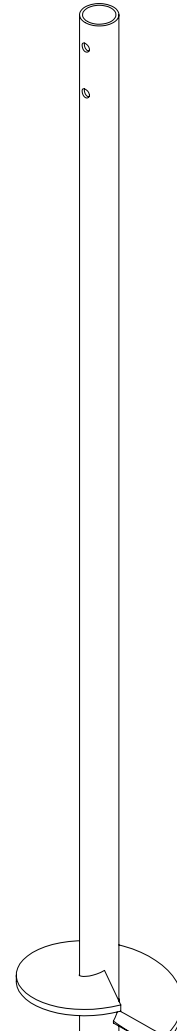
Load Specifications

Max. Allowable Capacity*	6.7 kips (29.8 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

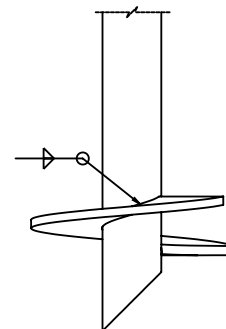
Commonly Used Structure	Light Residential
Code Evaluation	Listed per CCMC 13059-R
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years per CCMC 13059-R
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm)
Thickness	0.375" (9.5 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	6" (152 mm) to 12" (305 mm)

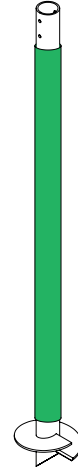
* Other sizes available upon request.



HELICAL PILES MODEL P1

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 2.125" (± 54.2 mm)
Length	± 66" (± 1.67 m)
Weight	± 0.65 lb (± 0.30 kg)
Material	HDPE
Color	Green



Pile Caps

Wood Structure Connectors

Pages 32, 34, 36, 38, 39,
41, 43

HELICAL PILES MODEL P2

Shaft

Wall Thickness	0.154" (3.91 mm)
Round HSS Outside Diameter	2.375" (60.3 mm)
Available Standard Lengths	5'-3" (1.6 m)/ 7'-0" (2.1 m) / 10'-6" (3.2 m)

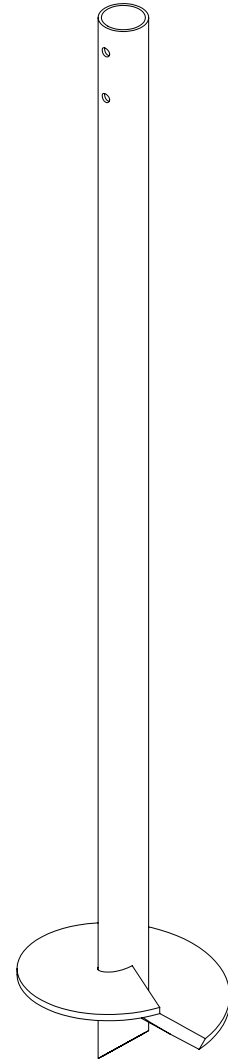
Load Specifications

Max. Allowable Capacity*	11 kips (49 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

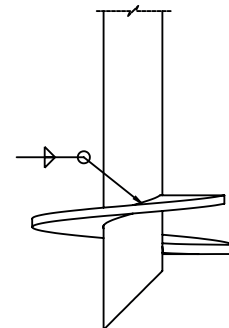
Commonly Used Structure	Medium Residential Light Commercial
Code Evaluation	Listed per CCMC 13059-R
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years per CCMC 13059-R
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.375" (9.5 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	6" (152 mm) to 16" (406 mm)

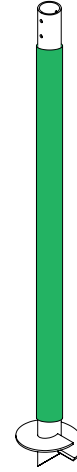
* Other sizes available upon request.



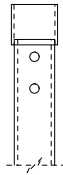
HELICAL PILES MODEL P2

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Round HSS Outside Diameter	± 2.625" (± 66.7 mm)
Length	± 66" (± 1.67 m)
Weight	± 0.95 lb (± 0.43 kg)
Material	HDPE
Color	Green



Outside Couplings



Regular

Assembly	Welded
Wall Thickness	0.203" (5 mm)
Round HSS Outside Diameter	2.875" (73 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	1.25" (31.8 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 32, 34, 36, 38, 39, 41, 43, 47, 48
Steel Structure Connectors	Page 46
Concrete Construction Connectors	Pages 46, 49-51

HELICAL PILES MODEL P2.5

Shaft

Wall Thickness	0.203" (5.16 mm)
Round HSS Outside Diameter	2.875" (73.0 mm)
Available Standard Lengths	5'-3" (1.6 m) / 7'-0" (2.1 m) / 10'-6" (3.2 m)

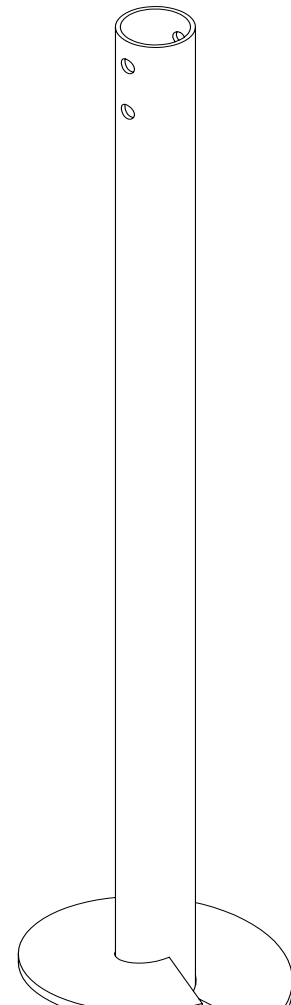
Load Specifications

Max. Allowable Capacity*	20 kips (kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

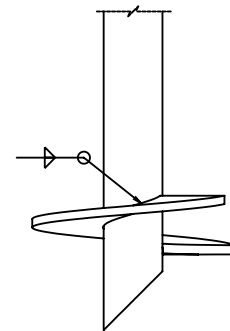
Commonly Used Structure	Medium Residential Light Commercial
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.375" (9.5 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	8" (203 mm) to 24" (610 mm)

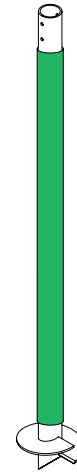
* Other sizes available upon request.



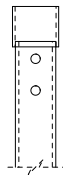
HELICAL PILES MODEL P2.5

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 3.125" (± 79.4 mm)
Length	± 66" (± 1.67 m)
Weight	± 1.25 lb (± 0.57 kg)
Material	HDPE
Color	Green



Outside Couplings



Regular

Assembly	Welded
Wall Thickness	0.216" (5.49 mm)
Round HSS Outside Diameter	3.5" (88.9 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3.5" (88.9 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 33, 40, 42, 44, 45, 47, 48
Steel Structure Connectors	Page 46
Concrete Construction Connectors	Pages 46, 49-51

HELICAL PILES MODEL P3

Shaft

Wall Thickness	0.216" (5.49 mm)
Round HSS Outside Diameter	3.5" (88.9 mm)
Available Standard Lengths	5'-3" (1.6 m)/ 7'-0" (2.1 m) / 10'-6" (3.2 m)

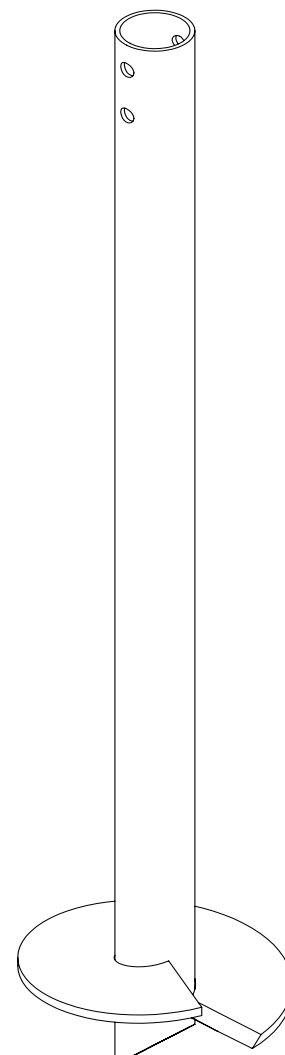
Load Specifications

Max. Allowable Capacity*	33.75 kips (150.0 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

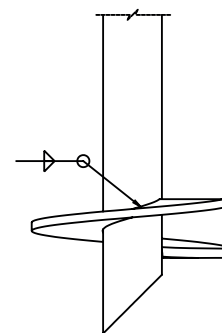
Commonly Used Structure	Heavy Residential
	Light to Medium Commercial
	Industrial
Code Evaluation	Listed per CCMC 13059-R
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years per CCMC 13059-R
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	8" (203 mm) to 24" (610 mm)

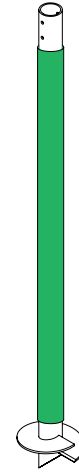
* Other sizes available upon request.



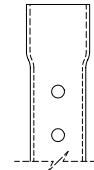
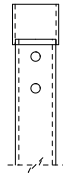
HELICAL PILES MODEL P3

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 3.75" (± 95.2 mm)
Length	± 66" (± 1.67 m)
Weight	± 1.52 lb (± 0.69 kg)
Material	HDPE
Color	Green



Outside Couplings



	Regular	Expanded
Assembly	Welded	-
Wall Thickness	0.226" (5.74 mm)	0.188" (4.78 mm)
Round HSS Outside Diameter	4" (101.6 mm)	4" (101.6 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3.5" (88.9 mm)	2.5" (63.5 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 33, 35, 37, 40, 42, 44, 45, 47, 48
Steel Structure Connectors	Pages 46
Concrete Construction Connectors	Pages 46, 49-51

Foundation Repair Brackets

Concrete Wall	Page 53
Concrete Masonry Unit (CMU) Wall	Pages 54-56
Interior Concrete Wall	Page 57

HELICAL PILES MODEL P3HD

Shaft

Wall Thickness	0.300" (7.62 mm)
Round HSS Outside Diameter	3.5" (88.9 mm)
Available Standard Lengths	5'-3" (1.6 m) / 7'-0" (2.1 m) / 10'-6" (3.2 m)

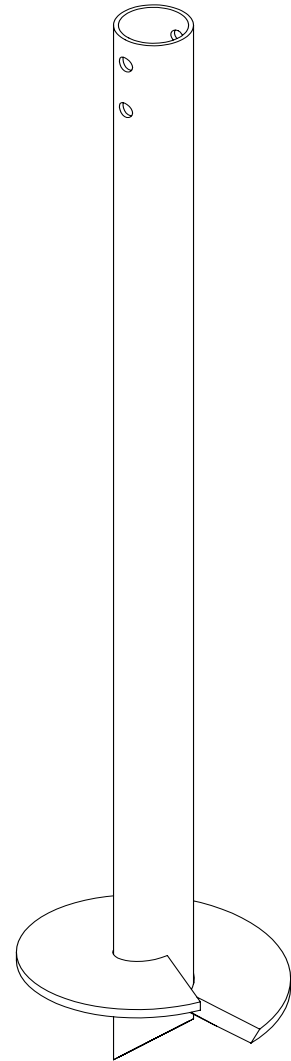
Load Specifications

Max. Allowable Capacity*	45 kips (200 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

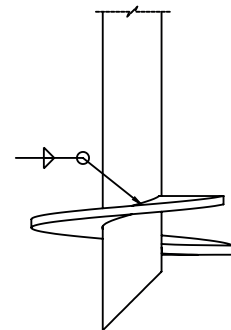
Commonly Used Structure	Heavy Residential
	Light to Heavy Commercial
	Industrial
Code Evaluation	Listed per CCMC 13059-R
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	8" (203 mm) to 24" (610 mm)

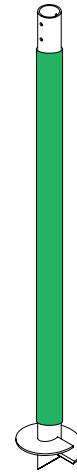
* Other sizes available upon request.



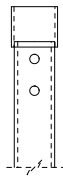
HELICAL PILES MODEL P3HD

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 3.75" (± 95.2 mm)
Length	± 66" (± 1.67 m)
Weight	± 1.52 lb (± 0.69 kg)
Material	HDPE
Color	Green



Outside Couplings



Regular

Assembly	Welded
Wall Thickness	0.226" (5.74 mm)
Round HSS Outside Diameter	4" (101.6 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3.5" (88.9 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 47, 48
Steel Structure Connectors	Pages 46
Concrete Construction Connectors	Pages 46, 49-51

Foundation Repair Brackets

Concrete Wall	Page 53
Concrete Masonry Unit (CMU) Wall	Pages 54-56
Interior Concrete Wall	Page 57

HELICAL PILES MODEL P4

Shaft

Wall Thickness	0.226" (5.74 mm)
Round HSS Outside Diameter	4" (101.6 mm)
Available Standard Lengths	5'-3" (1.6 m) / 7'-0" (2.1 m) / 10'-6" (3.2 m)

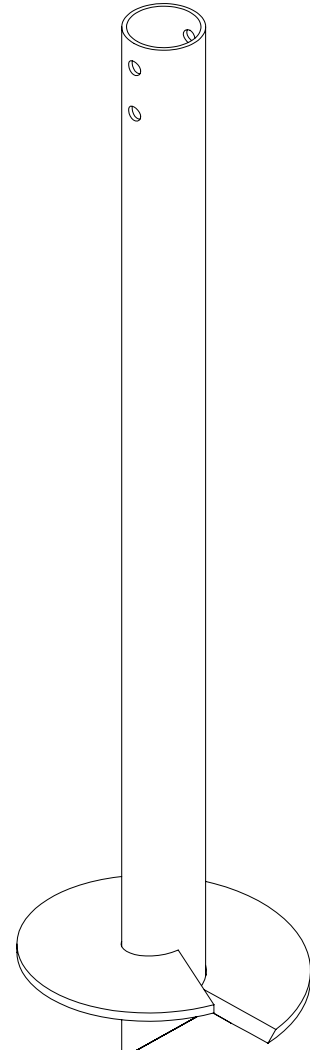
Load Specifications

Max. Allowable Capacity*	45 kips (200 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

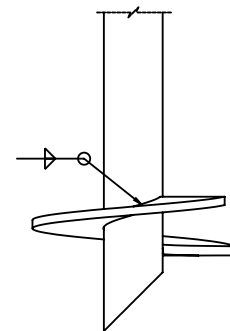
Commonly Used Structure	Heavy Residential Light to Medium Commercial Industrial
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	8" (203 mm) to 24" (610 mm)

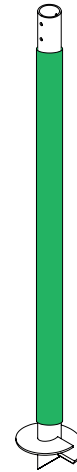
* Other sizes available upon request.



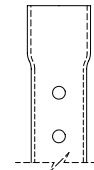
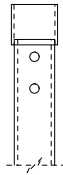
HELICAL PILES MODEL P4

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 4.25" (± 108 mm)
Length	± 66" (± 1.67 m)
Weight	± 1.61 lb (± 0.73 kg)
Material	HDPE
Color	Green



Outside Couplings



	Regular	Expanded
Assembly	Welded	-
Wall Thickness	0.237" (6.02 mm)	0.201" (5.11 mm)
Round HSS Outside Diameter	4.5" (114.3 mm)	4.5" (114.3 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3.5" (88.9 mm)	2.7" (68.5 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 47, 48
Steel Structure Connectors	Page 46
Concrete Construction Connectors	Pages 46, 49, 50

HELICAL PILES MODEL P4HD

Shaft

Wall Thickness	0.313" (7.95 mm)
Round HSS Outside Diameter	4" (101.6 mm)
Available Standard Lengths	6'-0" (1.83 m) / 8'-0" (2.4 m) / 12'-0" (3.7 m)

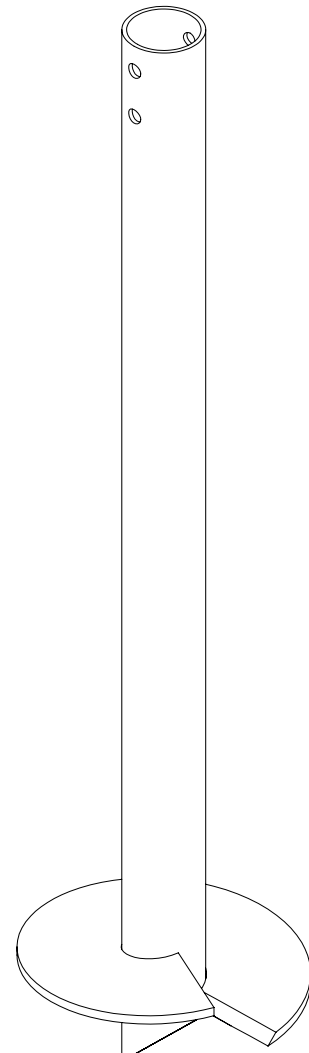
Load Specifications

Max. Allowable Capacity*	50 kips (222.2 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

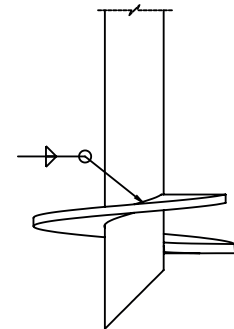
Commonly Used Structure	Heavy Residential
	Light to Heavy Commercial
	Industrial
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	3" (76.2 mm) / 5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	8" (203 mm) to 24" (610 mm)

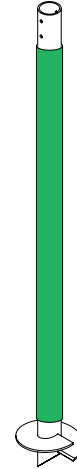
* Other sizes available upon request.



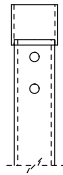
HELICAL PILES MODEL P4HD

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 4.25" (± 108 mm)
Length	± 66" (± 1.67 m)
Weight	± 1.61 lb (± 0.73 kg)
Material	HDPE
Color	Green



Outside Couplings



Regular

Assembly	Welded
Wall Thickness	0.237" (6.02 mm)
Round HSS Outside Diameter	4.5" (114.3 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3.5" (88.9 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Page 47
Steel Structure Connectors	Page 46
Concrete Construction Connectors	Page 46

HELICAL PILES MODEL P5

Shaft

Wall Thickness	0.258" (6.55 mm)
Round HSS Outside Diameter	5.563" (141.3 mm)
Available Standard Lengths	5'-3" (1.6 m) / 7'-0" (2.1 m) / 10'-6" (3.2 m)

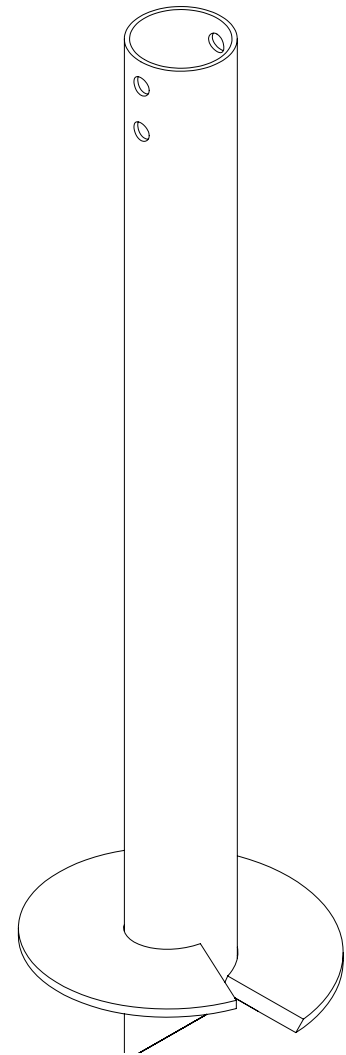
Load Specifications

Max. Allowable Capacity*	50 kips (222.2 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

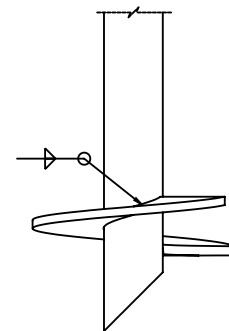
Commonly Used Structure	Heavy Residential
	Light to Heavy Commercial
	Industrial
Standard Steel	ASTM A500 Grade C
	Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W
	Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	12" (305 mm) to 24" (610 mm)

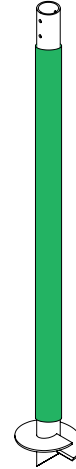
* Other sizes available upon request.



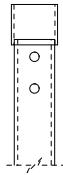
HELICAL PILES MODEL P5

Sleeve (Available)

Function Utility	Protection against soil movements
Wall Thickness	1/16" (1.6 mm)
Outside Diameter	± 5.75" (± 146 mm)
Length	± 66" (± 1.67 m)
Weight	± 3.11 lb (± 1.41 kg)
Material	HDPE
Color	Green



Outside Couplings



Regular

Assembly	Welded
Wall Thickness	0.188" (4.78 mm)
Round HSS Outside Diameter	6" (152.4 mm)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Length*	3" (76.2 mm)

* Factory welded or welded on site.

Pile Caps

Wood Structure Connectors	Pages 47, 48
Steel Structure Connectors	Page 46
Concrete Construction Connectors	Pages 46, 49,50

HELICAL PILES MODEL P6

Shaft

Wall Thickness	0.280" (7.11 mm)
Round HSS Outside Diameter	6.625" (168.3 mm)
Available Standard Lengths	5'-3" (1.6 m)/ 7'-0" (2.1 m) / 10'-6" (3.2 m)

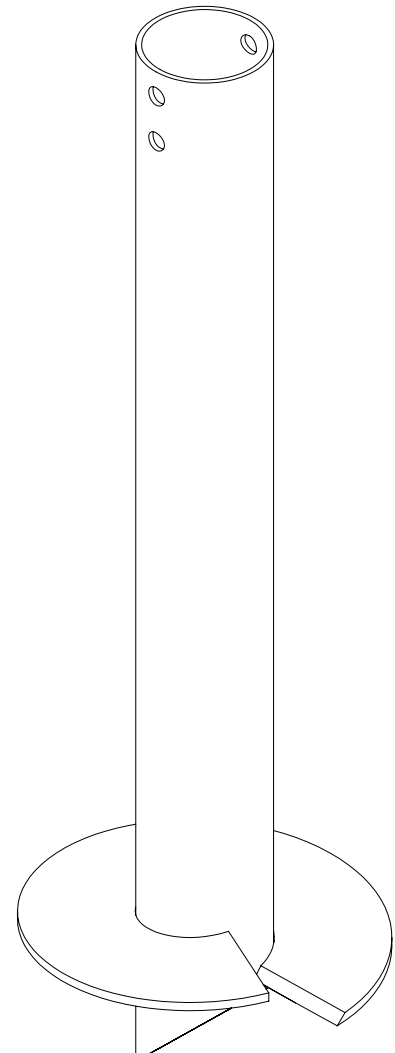
Load Specifications

Max. Allowable Capacity*	50 kips (222.2 kN)
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* Higher load ratings could be considered with site-specific engineering.

Technical Specifications

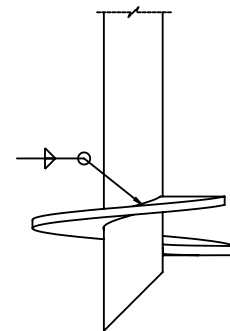
Commonly Used Structure	Heavy Residential
	Light to Heavy Commercial
	Industrial
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Helix

Pitch	5" (127 mm)
Thickness	0.5" (12.7 mm)
Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Coating	Galvanized or Black Steel
Multiple Welded Helix	Available
Helix Size*	12" (305 mm) to 24" (610 mm)

* Other sizes available upon request.

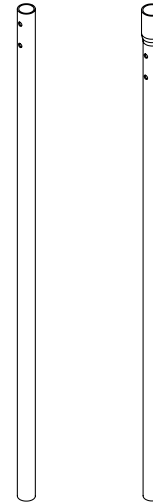


EXTENSIONS

R

Technical Specifications

Commonly Used Structure	Deep foundations
Code Evaluation	Listed per CCMC 13059-R (P1, P2 and P3 piles)
Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123/A123M
Additional Corrosion Protection	Cathodic Protection System available



Dimensions Specifications

Extensions	Wall Thickness	Outside Diameter	Available Standard Lengths			
R1	0.145" (3.68 mm)	1.9" (48.3 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R2	0.154" (3.91 mm)	2.375" (60.3mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R2.5	0.203" (5.16 mm)	2.875" (73.0 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R3	0.216" (5.49 mm)	3.5" (88.9 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R3-HD	0.300" (7.62 mm)	3.5" 88.9 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R4	0.226" (5.74 mm)	4" (101.6 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R4-HD	0.313" (7.95 mm)	4" (101.6 mm)	6'-0"	(1.8m)	8'-0" (2.4 m)	12'-0" (3.7 m)
R5	0.258" (6.55 mm)	5.563" (141.3 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)
R6	0.280" (7.11 mm)	6.625" (168.3 mm)	5'-3"	(1.6m)	7'-0" (2.1 m)	10'-6" (3.2 m)

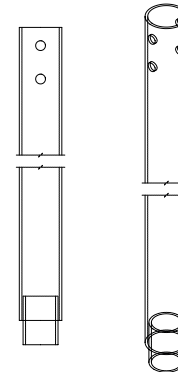
EXTENSIONS

WELDED INSIDE COUPLING

UIS

Technical Specifications

Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



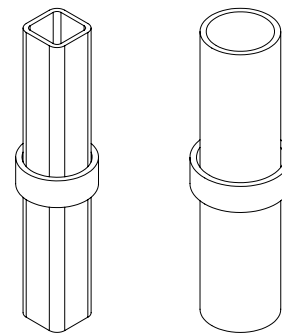
Dimensions

For	Assembly	Outside Diameter	Wall Thickness	Length
R1 (UIS-1)	Welded	1.5" (38.1 mm)	0.125" (3.18 mm)	4" (101.6 mm)
R2 (UIS-2)	Welded	1.9" (48.3 mm)	0.145" (3.68 mm)	4" (101.6 mm)
R3 (UIS-3)	Welded	2.875" (73.0 mm)	0.203" (5.16 mm)	4" (101.6 mm)
R4 (UIS-4)	Welded	3.5" (88.9 mm)	0.216" (5.49 mm)	4" (101.6 mm)
R5 (UIS-5)	Welded	5" (127.0 mm)	0.25" (6.35 mm)	4" (101.6 mm)
R6 (UIS-6)	Welded	6" (152.4 mm)	0.1875" (4.76 mm)	3" (76.2 mm)

Non-Welded Inside Coupling

Technical Specifications

Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



Dimensions

For	Assembly	Tubing			Ring Stopper		
		Outside Diameter	Wall Thickness	Length	Outside Diameter	Wall Thickness	Length
R1 (UI-1) (square tube)	Not Welded	1.25" (31.8 mm)	0.125" (3.18 mm)	8" (203.2 mm)	1.9" (48.3 mm)	0.145" (3.68 mm)	0.75" (19.0 mm)
R2 (UI-2) (round tube)	Not Welded	1.9" (48.3 mm)	0.145" (3.68 mm)	8" (203.2 mm)	2.375" (60.3 mm)	0.154" (3.91 mm)	0.75" (19.0 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - ADJUSTABLE

A1/2-ADJ + PUE-4 OR PUE-5



Application

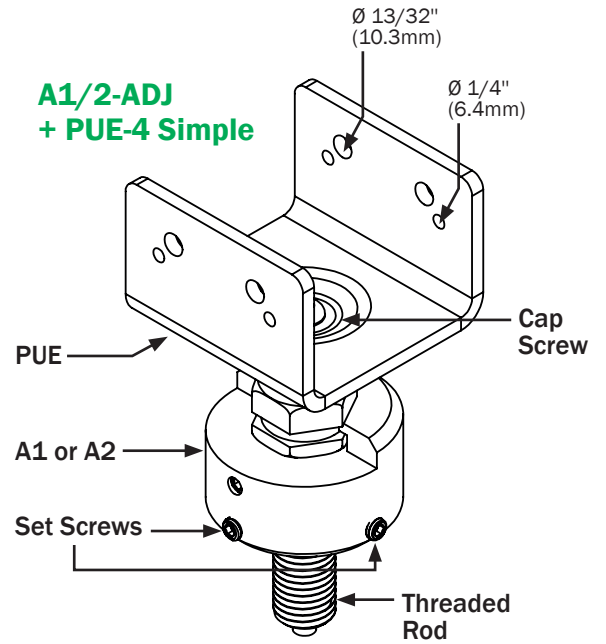
Used for connecting wood post and beams.

Technical Specifications

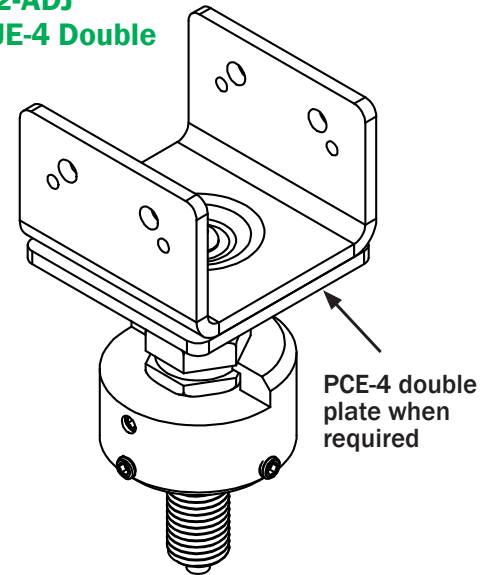
Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

A1/2-ADJ + PUE-4 Simple



A1/2-ADJ + PUE-4 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1, P2	A1/2-ADJ + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	N/A	0.25" (6.4 mm)
	A1/2-ADJ + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - ADJUSTABLE

A2.5/3-ADJ + PUE-4 OR PUE-5

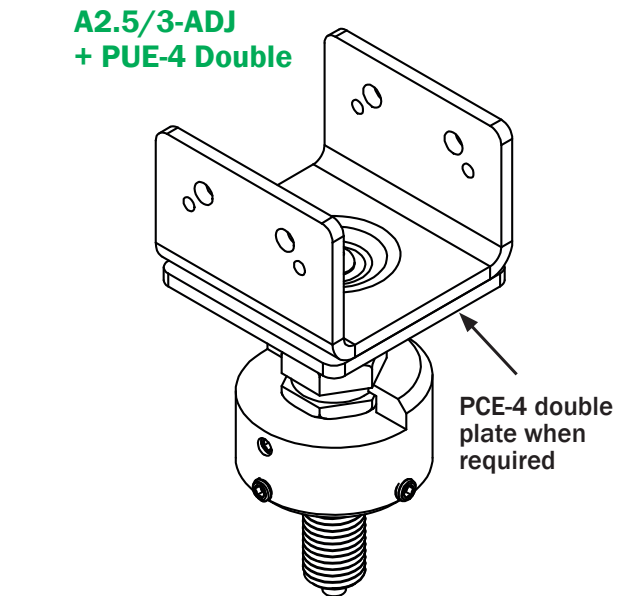
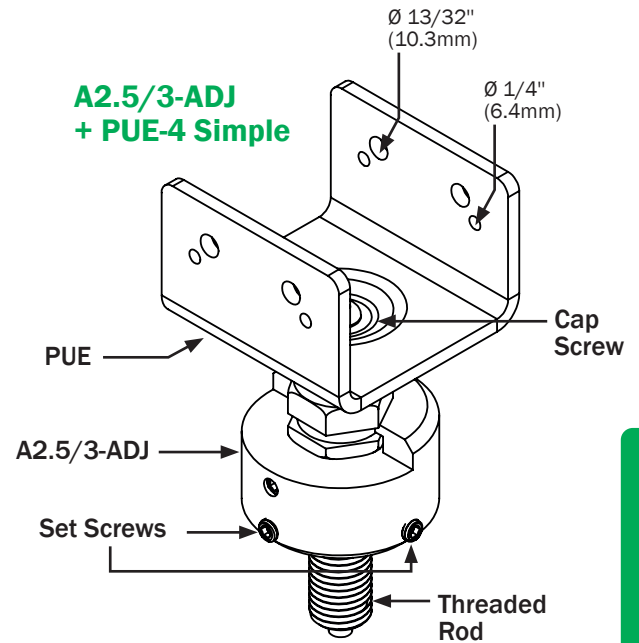
Application

Used for connecting wood post and beams.

Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P2.5 or P3	A2.5/3-ADJ + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	N/A	0.25" (6.4 mm)
	A2.5/3-ADJ + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - ADJUSTABLE (old version)

AS1 OR AS2 + PUE-4 OR PUE-5



Application

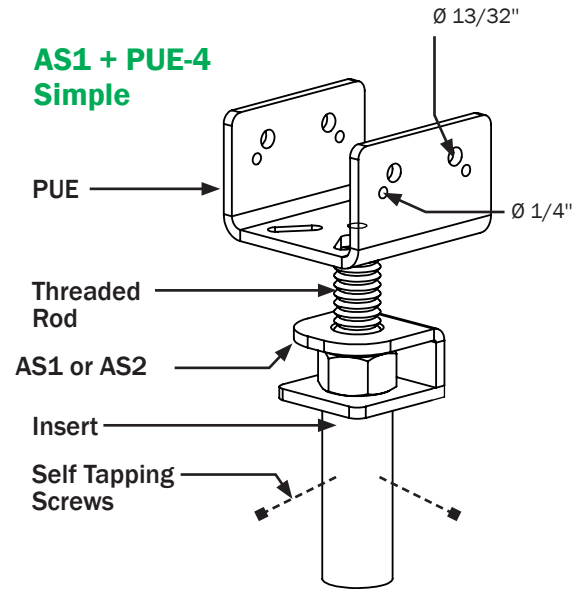
Used for connecting wood post and beams.

Technical Specifications

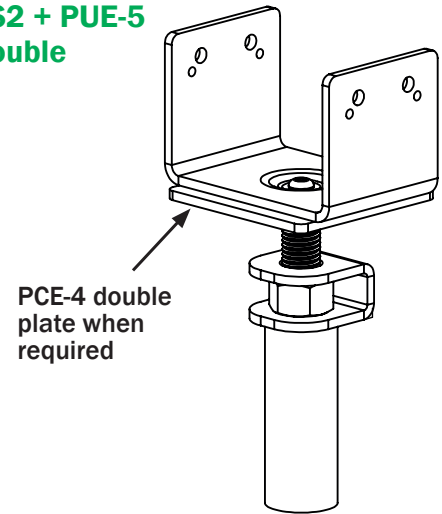
Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Threaded rod	1" Ø SAE Grade 2
Black Steel Design Lifemin.	50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

AS1 + PUE-4 Simple



AS2 + PUE-5 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1 or P2	AS1 or AS2 + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	2 - 3/4" (69.9 mm)	0.25" (6.4 mm)
	AS1 or AS2 + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - ADJUSTABLE (old version)

AS3 + PUE-4 OR PUE-5



Application

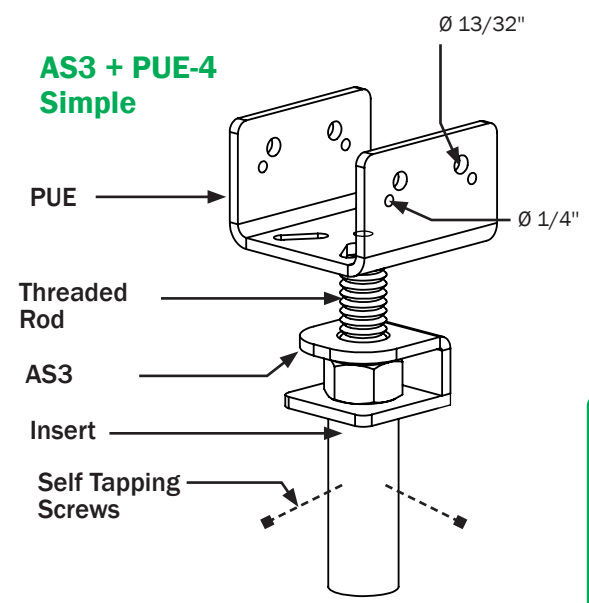
Used for connecting wood post and beams.

Technical Specifications

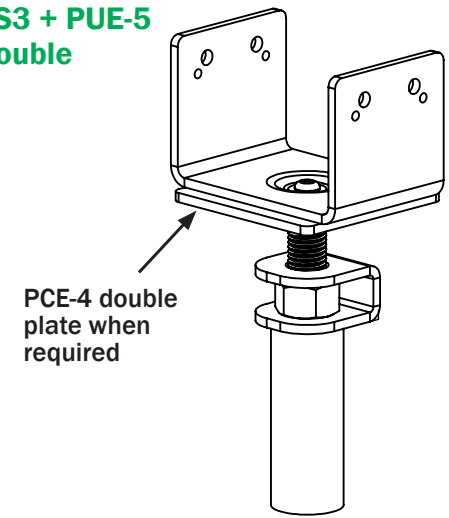
Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Threaded rod	1" Ø SAE Grade 2
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

AS3 + PUE-4 Simple



AS3 + PUE-5 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P3	AS3 + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	2 - 3/4" (69.9 mm)	0.25" (6.4 mm)
	AS3 + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

Pile Caps

WOOD STRUCTURE CONNECTORS

FLAT PLATE - ADJUSTABLE

A1/2-ADJ + PCE-4 OR PCE-5



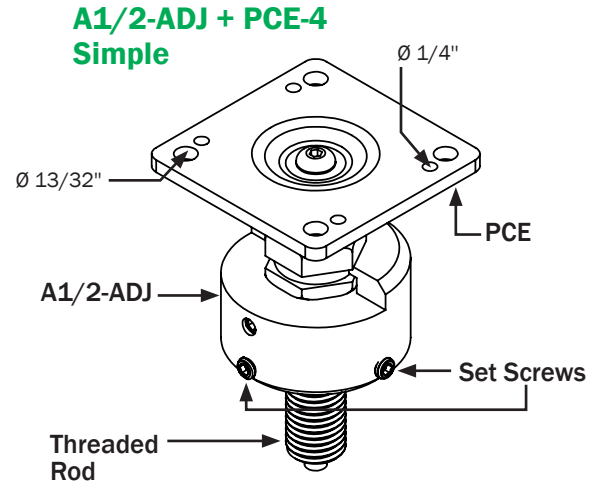
Application

Used for connecting wood post and beams.

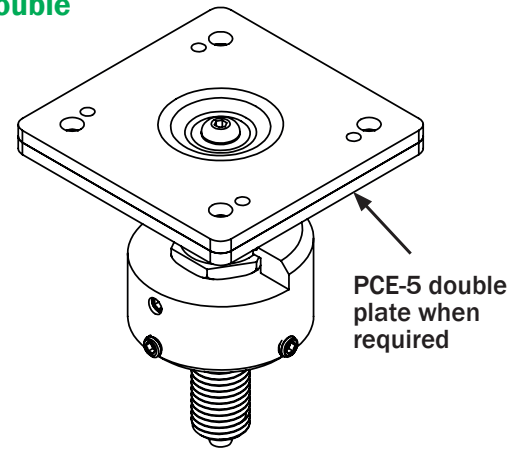
Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



A1/2-ADJ + PCE-5 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1, P2	A1/2-ADJ + PCE-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	A1/2-ADJ + PCE-5	5" (127 mm)		N/A	0.25" (6.4 mm)

Pile Caps

WOOD STRUCTURE CONNECTORS

FLAT PLATE - ADJUSTABLE

AS3 + PCE-4 OR PCE-5

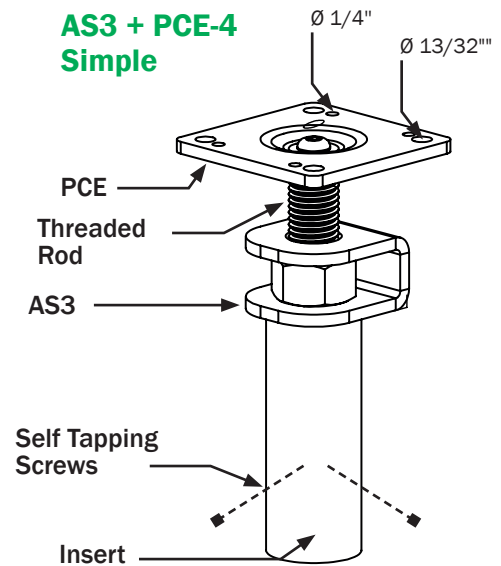
Application

Used for connecting wood post and beams.

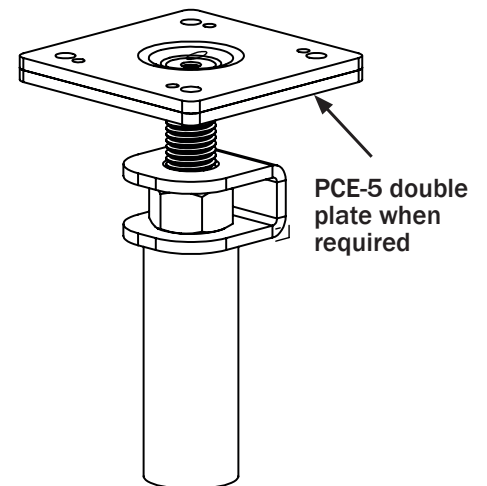
Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



AS3 + PCE-5 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P3	AS3 + PCE-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	AS3 + PCE-5	5" (127 mm)		N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

FLAT PLATE - ADJUSTABLE

AS1 OR AS2 + PCE-4 OR PCE-5

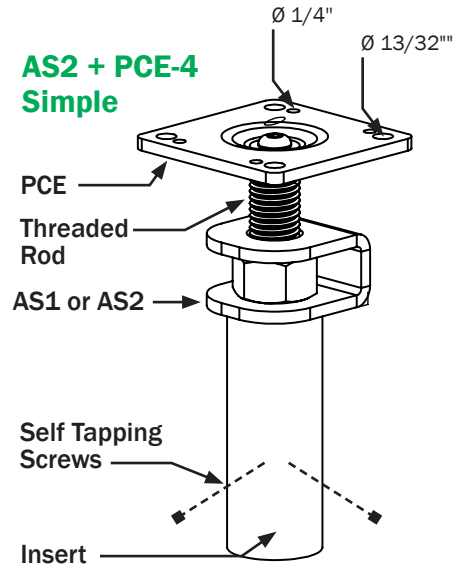
Application

Used for connecting wood post and beams.

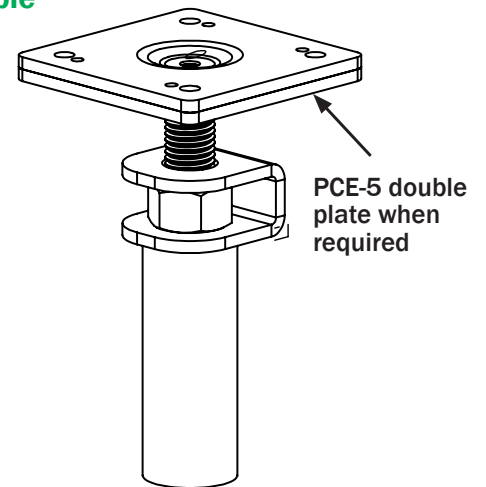
Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



AS2 + PCE-5 Double



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1 or P2	AS1 or AS2 + PCE-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	AS1 or AS2 + PCE-5	5" (127 mm)		N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - FIXED

A1/2-FIX + PUE-4 OR PUE-5

Application

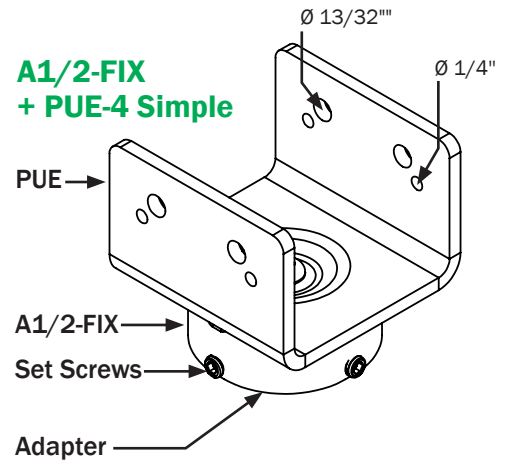
Used for connecting wood post and beams.

Technical Specifications

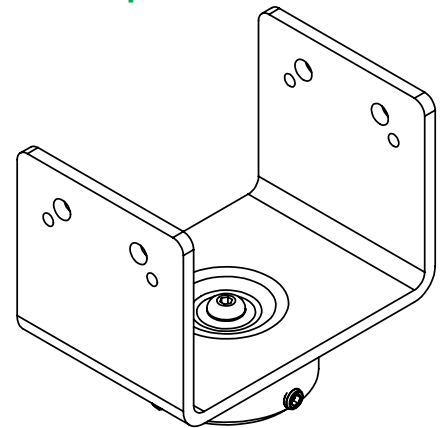
Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

A1/2-FIX + PUE-4 Simple



A1/2-FIX + PUE-5 Simple



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1, P2	A1/2-FIX + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	2.75" (69.9 mm)	0.25" (6.4 mm)
	A1/2-FIX + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - FIXED

A2.5/3-FIX + PUE-4 OR PUE-5

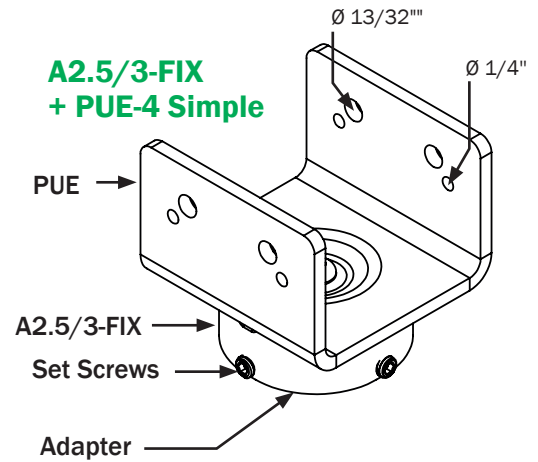
Application

Used for connecting wood post and beams.

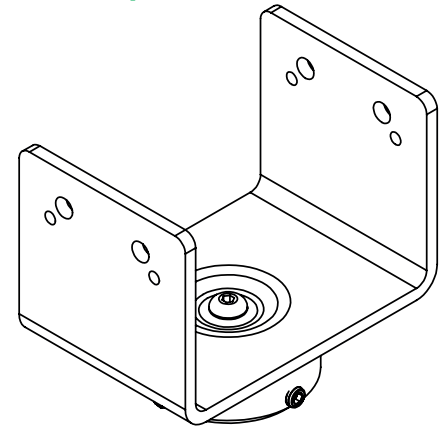
Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



A2.5/3-FIX + PUE-5 Simple



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P2.5 or P3	A2.5/3-FIX + PUE-4	4" (101.6 mm)	3.5625" (90.5 mm)	2.75" (69.9 mm)	0.25" (6.4 mm)
	A2.5/3-FIX + PUE-5	4" (101.6 mm)	5.5625" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

FLAT PLATE - FIXED

A1/2-FIX + PCE-4 OR PCE-5

Application

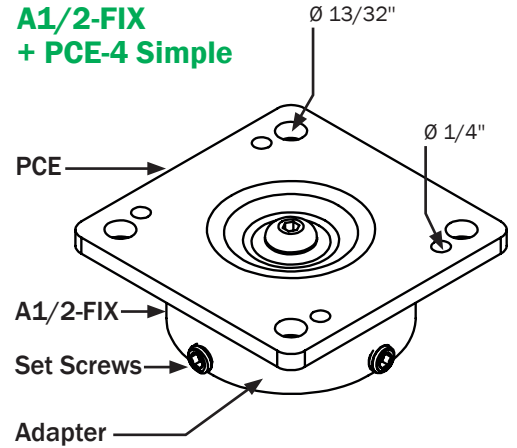
Used for connecting wood post and beams.

Technical Specifications

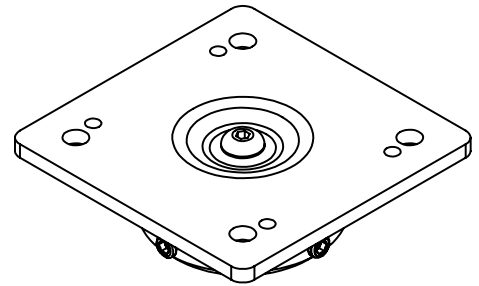
Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Lifemin.	50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

A1/2-FIX + PCE-4 Simple



A1/2-FIX + PCE-5 Simple



Pile Caps

Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1, P2	A1/2-FIX + PCE-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	A1/2-FIX + PCE-5	5" (127 mm)		N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

FLAT PLATE - FIXED

A2.5-3-FIX + PCE-4 OR PCE-5

Application

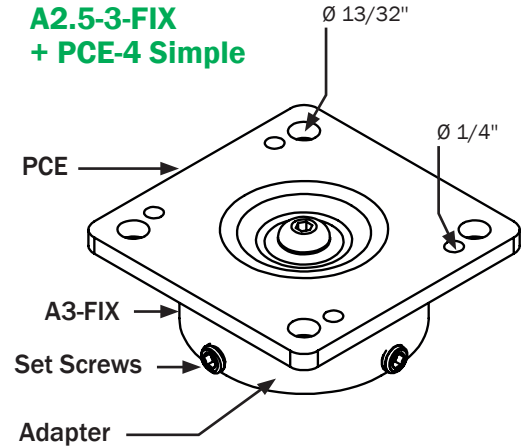
Used for connecting wood post and beams.

Technical Specifications

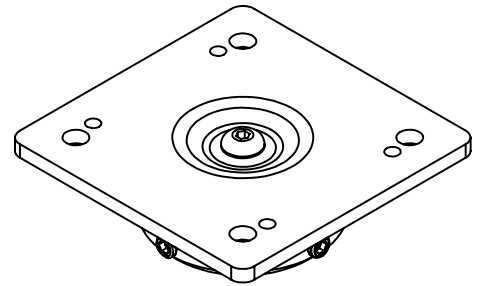
Material (standard) :

Cap	CSA G40.21 / 300W
Adapter	Casted 1018 steel
Threaded rod	1" Ø SAE Grade 2
Button head cap screw	3/8" Ø - Grade 5
Socket head set screws	3/8" Ø - Grade 5
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123

A2.5-3-FIX + PCE-4 Simple



A2.5-3-FIX + PCE-5 Simple



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P2.5 or P3	A2.5-3-FIX + PCE-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	A2.5-3-FIX + PCE-5	5" (127 mm)		N/A	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - FIXED

UF1-4 OR 5, UF2-4 OR 5

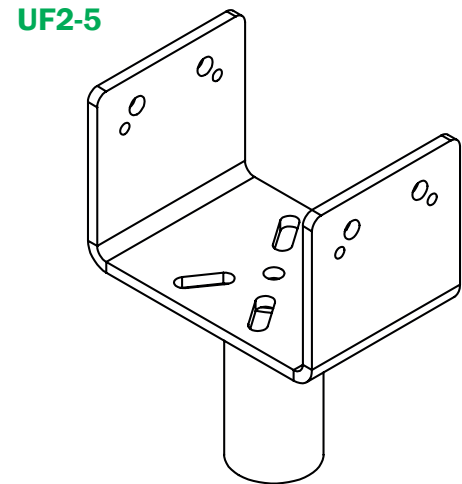
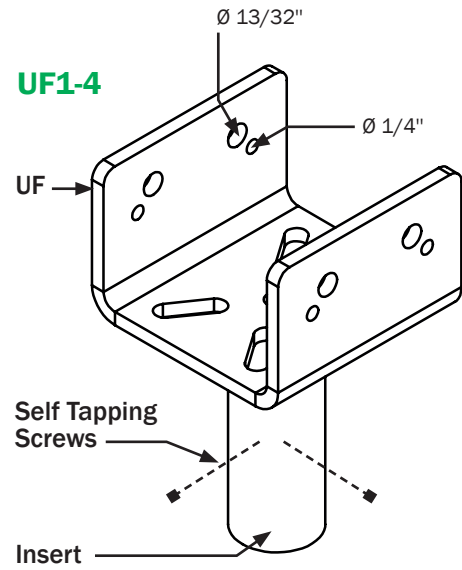
Application

Used for connecting wood post and beams.

Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P1 or P2	UF1-4 or UF2-4	4" (101.6 mm)	3.5625" (90.5 mm)	2.75" (69.9 mm)	0.25" (6.4 mm)
	UF1-5 or UF2-5	4" (101.6 mm)	5.5625" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - FIXED

UF2.5-4 OR 5, UF3-4 OR 5

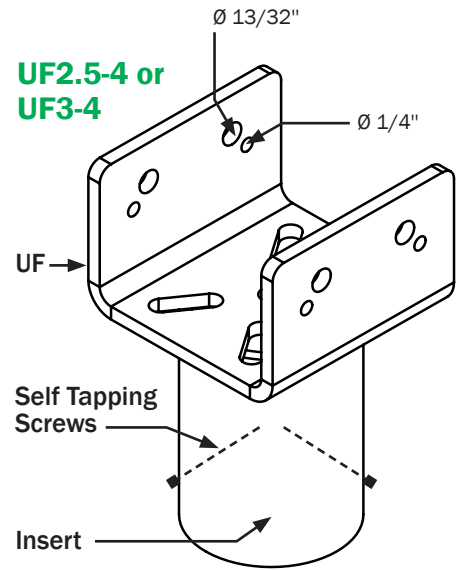
Application

Used for connecting wood post and beams.

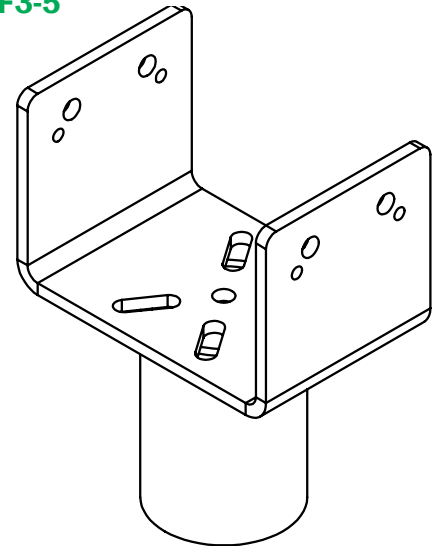
Technical Specifications

Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



UF2.5-5 or UF3-5



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P2.5 or P3	UF2.5-4 or UF3-4	4" (101.6 mm)	3.5625" (90.5 mm)	2.75" (69.9 mm)	0.25" (6.4 mm)
	UF2.5-5 or UF3-5	4" (101.6 mm)	5 - 9/16" (141.3 mm)	4" (101.6 mm)	0.25" (6.4 mm)

WOOD STRUCTURE CONNECTORS

U PLATE - FIXED

CF2.5-5, CF3-4 OR 5

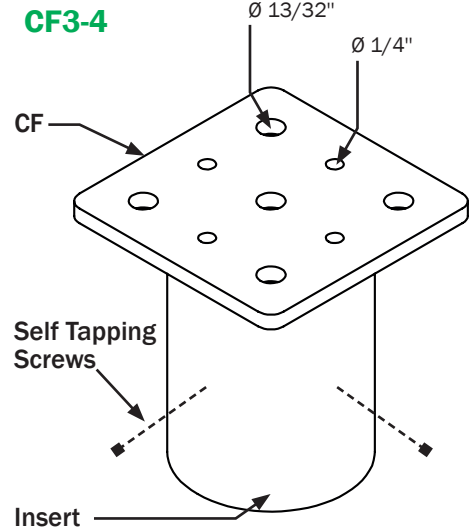
Application

Used for connecting wood post and beams.

Technical Specifications

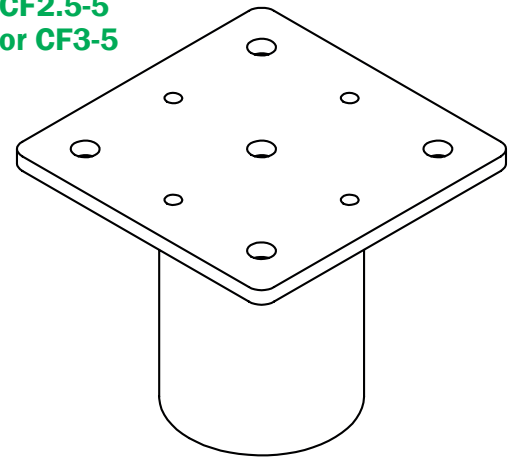
Material (standard) :

Cap	CSA G40.21 / 300W
Insert	ASTM A500 Grade C
Black Steel Design Life	min. 50 years
Coating	Galvanized
Galvanization compliance	ASTM A123



Pile Caps

CF2.5-5 or CF3-5



Geometry :

Pile Model	Model No.	Dimensions			
		Length	Width	Height	Thickness
P2.5 or P3	CF3-4	4" (101.6 mm)	4" (101.6 mm)	N/A	0.25" (6.4 mm)
	CF2.5-5 or CF3-5	5" (127 mm)		N/A	0.25" (6.4 mm)

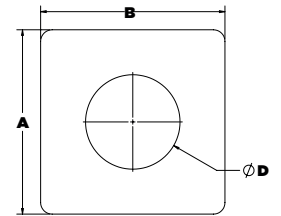
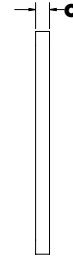
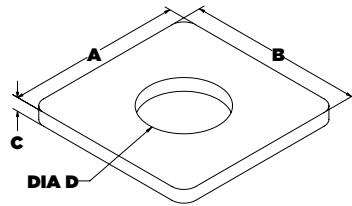
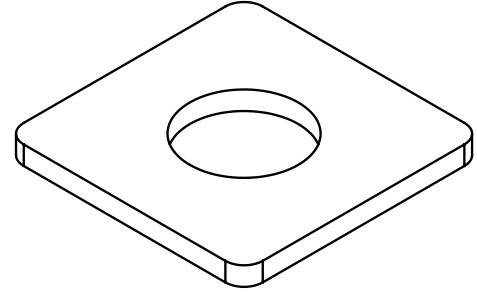
ALL STRUCTURE CONNECTORS

FLAT PLATE - WELDED

CP

Technical Specifications

Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



Pile Caps

Pile Model	Plate Dimensions			
	Length	Width	Thickness	Hole size
	A	B	C	D
P2	5" (127 mm)	5" (127 mm)	0.375" (9.5 mm)	2.5" (63.5 mm)
	6" (152 mm)	6" (152 mm)	0.5" (12.7 mm)	
	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	
P2.5	5" (127 mm)	5" (127 mm)	0.375" (9.5 mm)	3.0" (76.2mm)
	6" (152 mm)	6" (152 mm)	0.5" (12.7 mm)	
	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	
P3 and P3HD	5" (127 mm)	5" (127 mm)	0.375" (9.5 mm)	3.625" (92.1 mm)
	6" (152 mm)	6" (152 mm)	0.5" (12.7 mm)	
	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	
P4 and P4HD	5" (127 mm)	5" (127 mm)	0.375" (9.5 mm)	4.125" (104.8 mm)
	6" (152 mm)	6" (152 mm)	0.5" (12.7 mm)	
	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	
P5	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	5.6875" (144.5 mm)
P6	8" (203 mm)	8" (203 mm)	0.75" (19 mm)	6.75" (171.5 mm)

WOOD STRUCTURE CONNECTORS

BOX

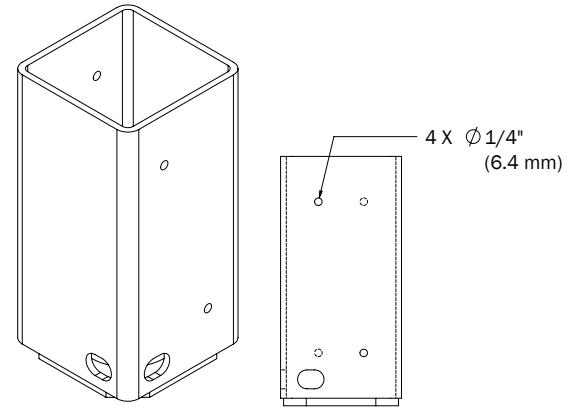
SP



Technical Specifications

Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123

Other available sizes upon request



Pile Model	Type of wood	Box Dimensions (interior)				Hole Size
		Length / Width	Thickness	Height		
		A	C	B		
P2	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	2.5" (63.5 mm)	
		5.625" (142.9 mm)				
		7.625" (193.7 mm)				
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)		
		6.09" (154.7 mm)				
		8.09" (205.5 mm)				
P2.5	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	3.0" (76.2 mm)	
		5.625" (142.9 mm)				
		7.625" (193.7 mm)				
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)		
		6.09" (154.7 mm)				
		8.09" (205.5 mm)				
P3 and P3HD	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	3.625" (92.1 mm)	
		5.625" (142.9 mm)				
		7.625" (193.7 mm)				
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)		
		6.09" (154.7 mm)				
		8.09" (205.5 mm)				
P4 and P4HD	Lumber (S4S, BQ)	5.625" (142.9 mm)	0.1875" (4.8 mm)	8" (203 mm)	4.25" (108 mm)	
		7.625" (193.7 mm)				
	Rough (RS, BB)	6.09" (154.7 mm)	0.25" (6.4 mm)	8" (203 mm)		
		8.09" (205.5 mm)				
P5	Lumber (S4S, BQ)	5.625" (142.9 mm)	0.1875" (4.8 mm)	8" (203 mm)	5.6875" (144.5 mm)	
		7.625" (193.7 mm)				
	Rough (RS, BB)	6.09" (154.7 mm)	0.25" (6.4 mm)	8" (203 mm)		
		8.09" (205.5 mm)				

Pile Caps

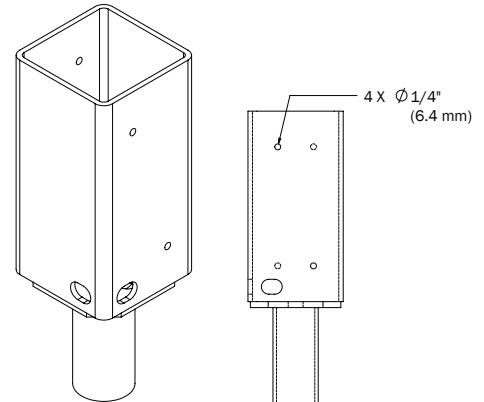
WOOD STRUCTURE CONNECTORS

BOX - FIXED / SPA



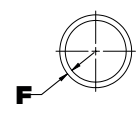
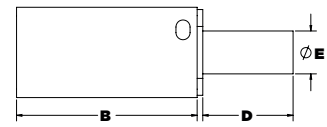
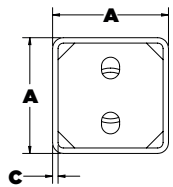
Technical Specifications

Plate Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Adapter Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



Other sizes available upon request.

Pile Caps



Pile Model	Type of Wood	Box Dimensions (interior)			Adapter Dimensions		
		Length / Width	Thickness	Height	Height	O.D.	Thickness
		A	C	B	D	E	F
P2	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	4" (102 mm)	1.9" (48.3 mm)	0.145" (3.7 mm)
		5.625" (142.9 mm)					
		7.625" (193.7 mm)					
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)			
		6.09" (154.7 mm)					
		8.09" (205.5 mm)					
P2.5	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	4" (102 mm)	2.875" (73.0 mm)	0.203" (5.16 mm)
		5.625" (142.9 mm)					
		7.625" (193.7 mm)					
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)			
		6.09" (154.7 mm)					
		8.09" (205.5 mm)					
P3 and P3HD	Lumber (S4S, BQ)	3.625" (92.1 mm)	0.1875" (4.8 mm)	8" (203 mm)	4" (102 mm)	2.875" (73.0 mm)	0.203" (5.2 mm)
		5.625" (142.9 mm)					
		7.625" (193.7 mm)					
	Rough (RS, BB)	4.09" (104.0 mm)	0.25" (6.4 mm)	8" (203 mm)			
		6.09" (154.7 mm)					
		8.09" (205.5 mm)					
P4	Lumber (S4S, BQ)	5.625" (142.9 mm)	0.1875" (4.8 mm)	8" (203 mm)	4" (102 mm)	3.5" (88.9 mm)	0.216" (5.5 mm)
		7.625" (193.7 mm)					
	Rough (RS, BB)	6.09" (154.7 mm)	0.25" (6.4 mm)	8" (203 mm)			
		8.09" (205.5 mm)					
P5	Lumber (S4S, BQ)	5.625" (142.9 mm)	0.1875" (4.8 mm)	8" (203 mm)	4" (102 mm)	4.5" (114.3 mm)	0.237" (6 mm)
		7.625" (193.7 mm)					
	Rough (RS, BB)	6.09" (154.7 mm)	0.25" (6.4 mm)	8" (203 mm)		5" (127 mm)	0.250" (6.4 mm)
		8.09" (205.5 mm)					

CONCRETE STRUCTURE CONNECTORS

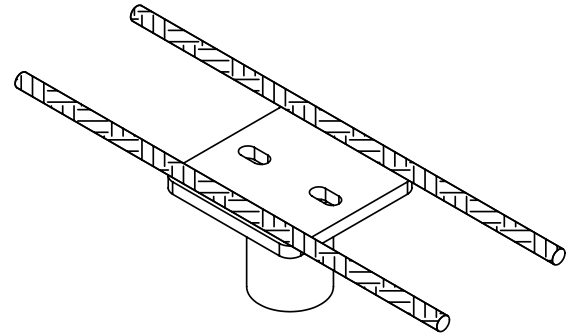
FLAT PLATE - WITH HORIZONTAL REBAR

Application

Used to connect to concrete footings, grade beam, or slabs.

Technical Specifications

Plate Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Adapter Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Rebar Standard Steel	CSA G30.18-58W Fy=58 ksi min (400 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



Geometry / Allowable Capacity

Pile Model	Model number	Quantity of Rebar	Plate Dimensions
P2	CF2-5N-2A	2 # 5 x 20" long	5" x 5" x 0.375"
P2.5	CF2.5-6N-2A		5" x 5" x 0.375"
P3 or P3HD	CF3-6N-2A		6" x 6" x 0.5"
P4	CF4-6N-2A		6" x 6" x 0.5"
P5	CF5-6N-2A		6" x 6" x 0.5"

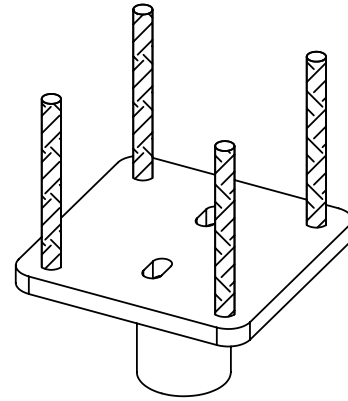
CONCRETE STRUCTURE CONNECTORS FLAT PLATE - WITH VERTICAL REBAR

Application

Used to connect to concrete footings, grade beam, or slabs.

Technical Specifications

Plate Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Adapter Standard Steel	ASTM A500 Grade C Fy=51 ksi min (350 MPa)
Rebar Standard Steel	CSA G30.18-58W Fy=58 ksi min (400 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123



Geometry / Allowable Capacity

Plate Model	Quantity of Rebar	Plate Dimensions
P2	4 # 5 x Variable	5" x 5" x 0.375"
P2.5		5" x 5" x 0.375"
P3 or P3HD		6" x 6" x 0.5"
P4		6" x 6" x 0.5"
P5		6" x 6" x 0.5"

CONCRETE STRUCTURE CONNECTORS

COUPLING WITH VERTICAL REBAR

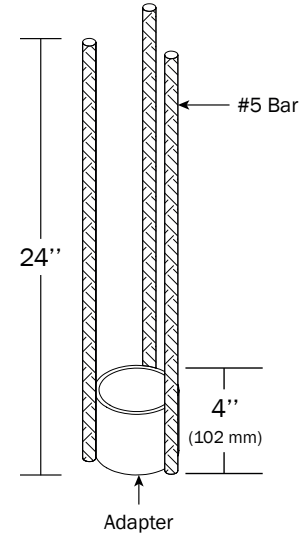
RC2-2, RC2.5-2, RC3-2 OR RC3-3

Application

Used to connect to concrete structures such as concrete grade beams and isolated sono-tube pile caps.

Technical Specifications

Adapter Standard Steel	ASTM A500 GRADE C
Reinforcing Steel	A706 GR60 (CSA G30.18.58W)
Black Steel Design Life	min. 50 years
Coating	Galvanized per ASTM 123 or Black Steel



Pile Caps

Geometry / Allowable Capacity

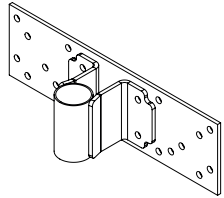
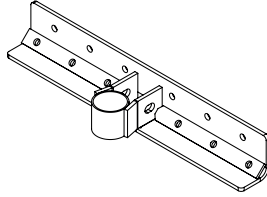
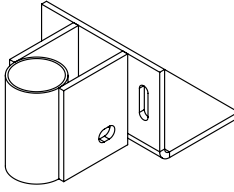
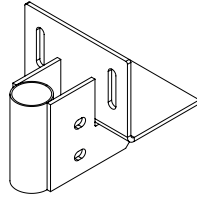
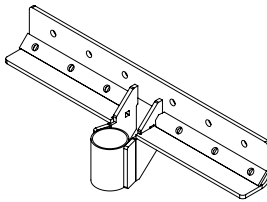
Pile Model	Cap Model No.	Quantity of #5 Bars	Adapter
P2	RC2-2	2	2.875" (73.0 mm) x 0.203" (5.16 mm)
P2.5	RC2.5-2	2	3.5" (88.9mm) x 0.216" (5.49mm)
P3 or P3HD	RC3-2	2	4.000" (101.6 mm) x 0.226" (5.74 mm)
	RC3-3	3	

FOUNDATION REPAIR BRACKETS

GENERAL INFORMATIONS / SM

Technical Specifications

Standard Steel	CSA G40.21-44W Fy=44 ksi min (300 MPa)
Black Steel Design Life	min. 50 years
Coating	Galvanized or Black Steel
Galvanization Compliance	ASTM A123

Pile Model	Bracket Model	Drawing	Dimensions		
			A	B	C
P3 or P3HD	SM-1 Concrete Wall #1		See shop drawings p.53		
P3 or P3HD	SM-2 Concrete Masonry Unit (CMU) Wall #2		See shop drawings p.54		
P3 or P3HD	SM-3 Concrete Masonry Unit (CMU) Wall #3		See shop drawings p.55		
P3 or P3HD	SM-4 Concrete Masonry Unit (CMU) Wall #4		See shop drawings p.56		
P3 or P3HD	SM-5 Interior Concrete Wall #5		See shop drawings p.57		

Foundation Repair Brackets

FOUNDATION REPAIR BRACKETS

CONCRETE WALL #1

SM-1

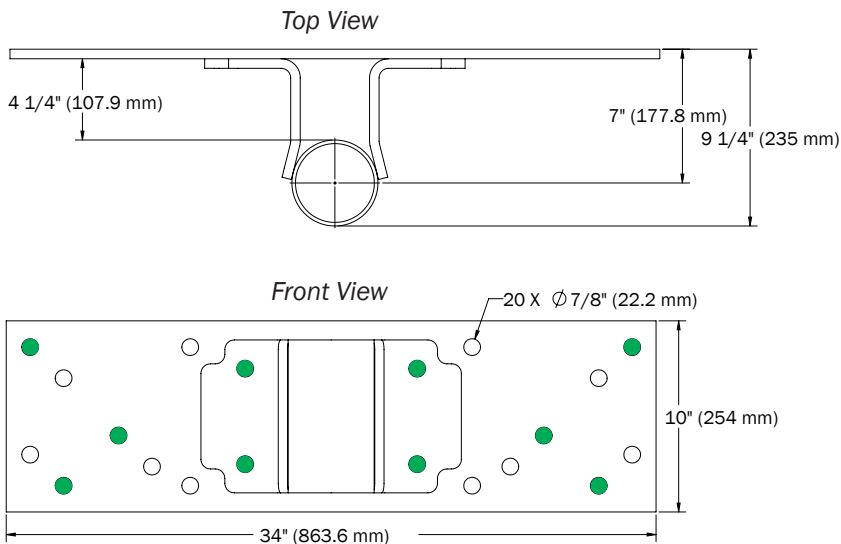
Application

Underpinning bracket used to stabilize or lift concrete foundation walls

Technical Specifications

Material specifications are available upon request.

Geometry Wall Bracket (SM-1)



- Primary bolt locations
- Alternate bolt locations

Installation Instructions

1. Locate and clear all utilities.
2. Excavate in a safe manner to base of the footing.
3. Cut and chip footing back to face of wall.
4. Partially install helical pile lead section.
5. Position wall bracket and footing leg.
6. Bolt wall bracket to wall.
7. Continue helical pile installation as required to meet load.
8. Cut off pile to desired height.
9. Preload, lift as needed, and weld off all connections.

Jack Support (SV)
For pre-loading
and lifting only

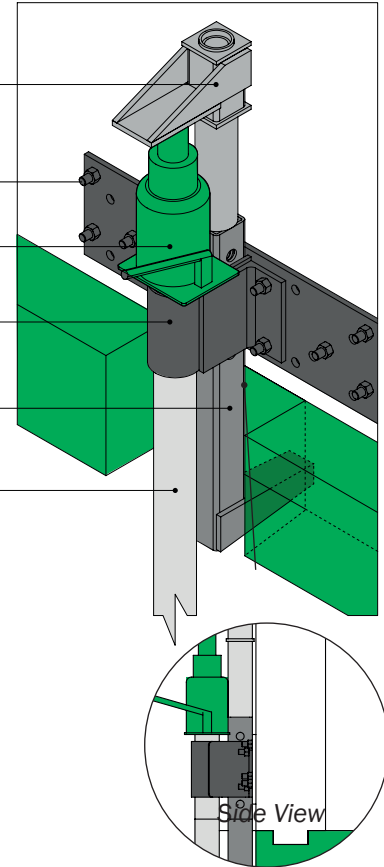
Mechanical Anchor
Bolts 3/4" x 8"
(19 mm x 203 mm)

Hydraulic Jack
For preloading
and lifting only

Wall Bracket (SM-1)

Footing Leg (SE)
required

Helical Pile (P3)
Extension



FOUNDATION REPAIR BRACKETS

CONCRETE MASONRY UNIT (CMU) WALL #2

SM-2

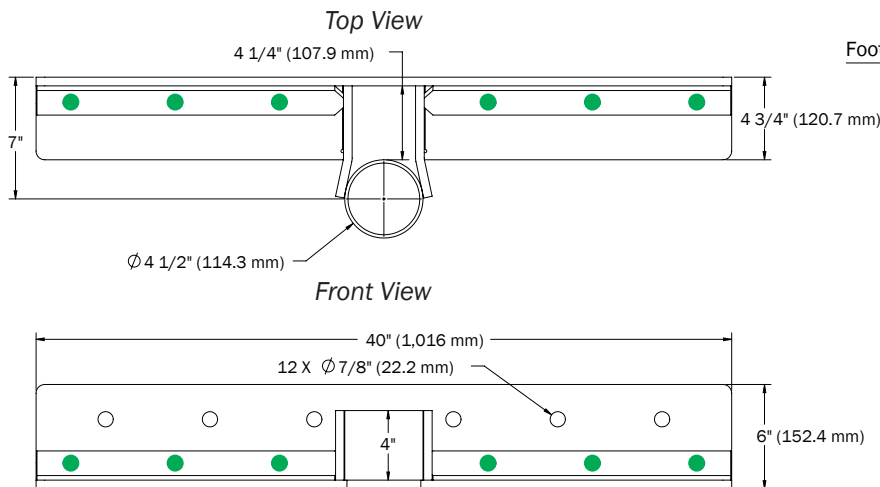
Application

Underpinning bracket to stabilize or lift masonry and concrete foundations that are supported on concrete spread footings.

Technical Specifications

Material specifications are available upon request.

Geometry Wall Bracket (SM-2)



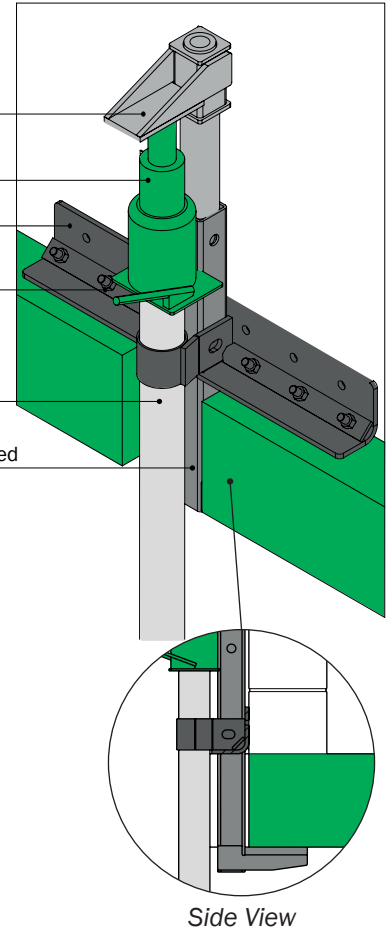
Jack Support (SV)
For pre-loading
and lifting only

Hydraulic Jack
For preloading
and lifting only

Wall Bracket (SM-2)
Mechanical Anchor
Bolts 3/4" x 8"
(19 mm x 203 mm)

Helical Pile (P3)
Extension

Footing Leg (SE) required



Side View

- Primary bolt locations
- Alternate bolt locations

Installation Instructions

1. Locate and clear all utilities.
2. Excavate in a safe manner to base of the footing.
3. Cut and chip footing back to face of wall.
4. Partially install helical pile lead section.
5. Position wall bracket and footing leg.
6. Bolt wall bracket to wall.
7. Continue helical pile installation as required to meet load.
8. Cut off pile to desired height.
9. Preload, lift as needed, and weld off all connections.

FOUNDATION REPAIR BRACKETS

CONCRETE MASONRY UNIT (CMU) WALL #3

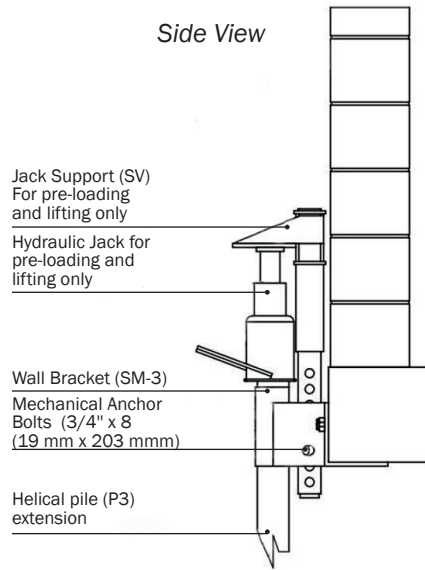
SM-3

Application

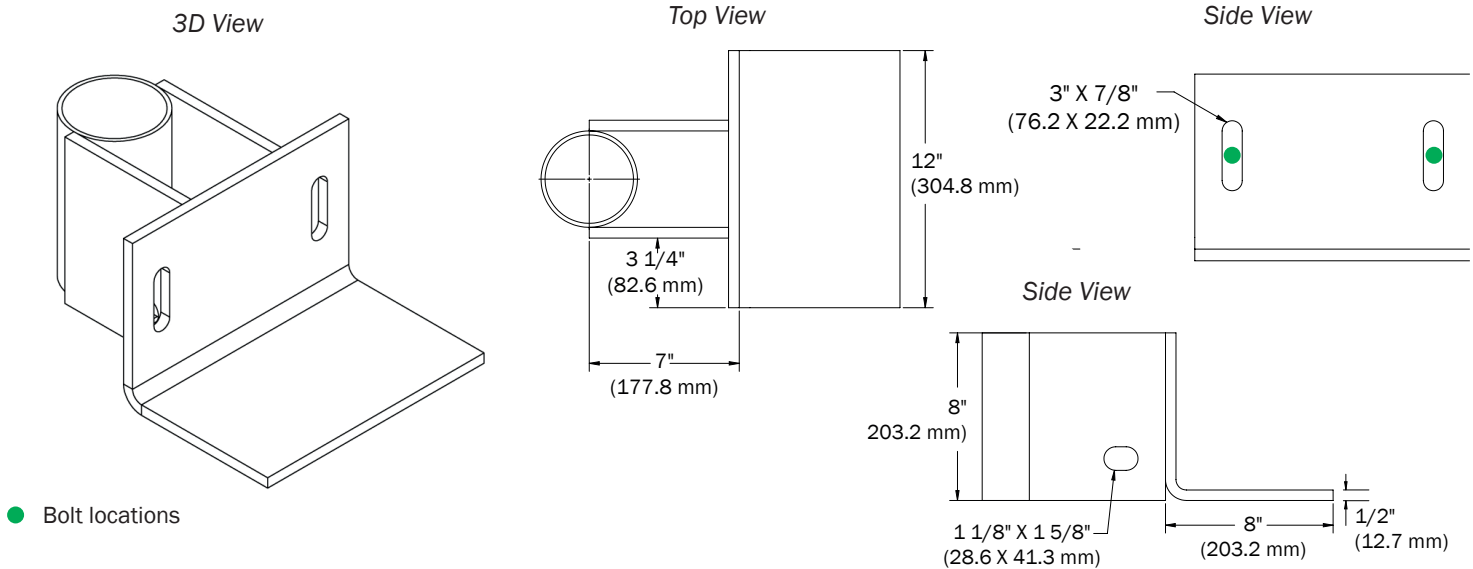
Underpinning bracket to stabilize or lift masonry and concrete foundations that are supported on concrete spread footings.

Technical Specifications

Material specifications are available upon request.



Geometry Wall Bracket (SM-3)



● Bolt locations

Installation Instructions

1. Locate and clear all utilities.
2. Excavate in a safe manner to base of the footing.
3. Cut and chip footing back to face of wall.
4. Partially install helical pile lead section.
5. Position wall bracket.
6. Bolt wall bracket to wall.
7. Continue helical pile installation as required to meet load.
8. Cut off pile to desired height.
9. Preload, lift as needed, and weld off all connections.

FOUNDATION REPAIR BRACKETS

CONCRETE MASONRY UNIT (CMU) WALL #4

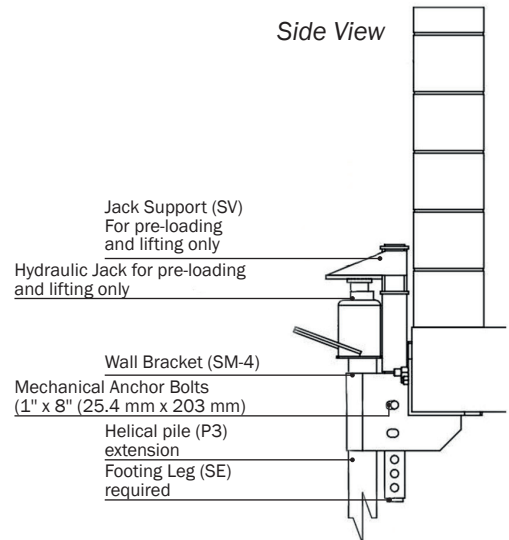
SM-4

Application

Underpinning bracket to stabilize or lift masonry and concrete foundations that are supported on concrete spread footings.

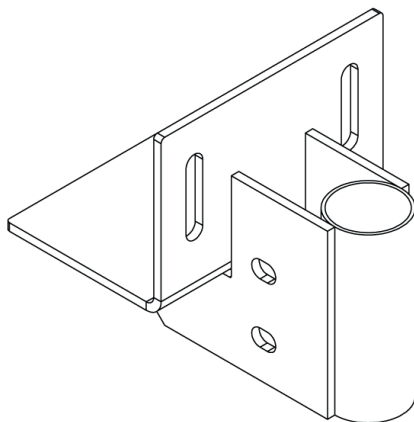
Technical Specifications

Material specifications are available upon request.

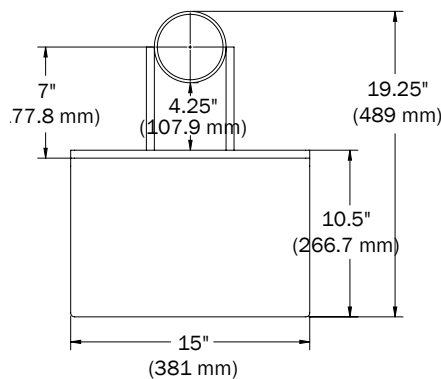


Geometry Wall Bracket (SM-4)

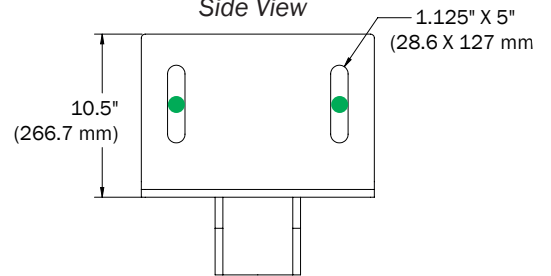
3D View



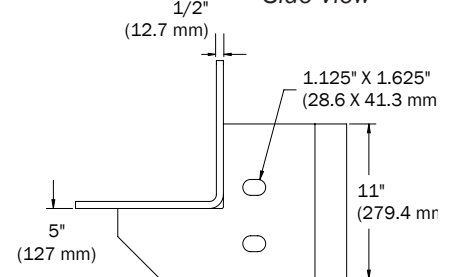
Top View



Side View



Side View



● Bolt locations

Installation Instructions

1. Locate and clear all utilities.
2. Excavate in a safe manner to base of the footing.
3. Cut and chip footing back to face of wall.
4. Partially install helical pile lead section.
5. Position wall bracket.
6. Bolt wall bracket to wall.
7. Continue helical pile installation as required to meet load.
8. Cut off pile to desired height.
9. Preload, lift as needed, and weld off all connections.

FOUNDATION REPAIR BRACKETS

INTERIOR CONCRETE WALL #5

SM-5

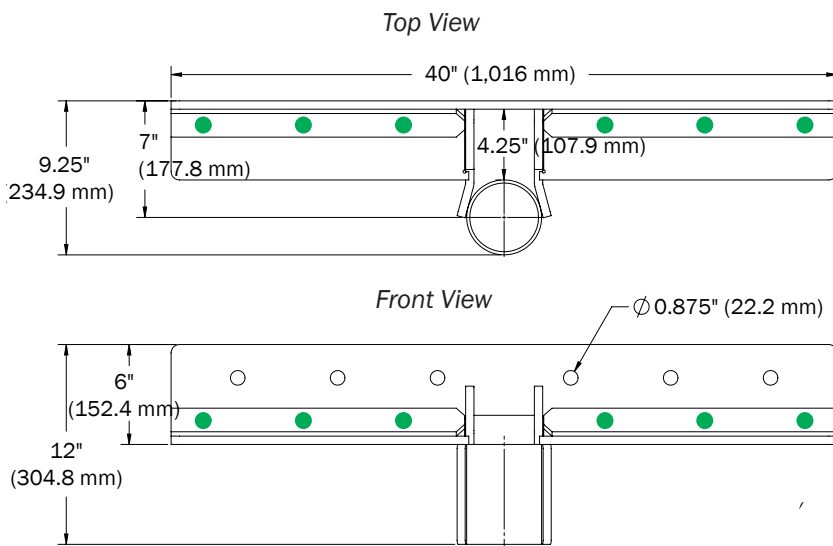
Application

Underpinning bracket to stabilize or lift masonry and concrete foundations that are supported on concrete spread footings.

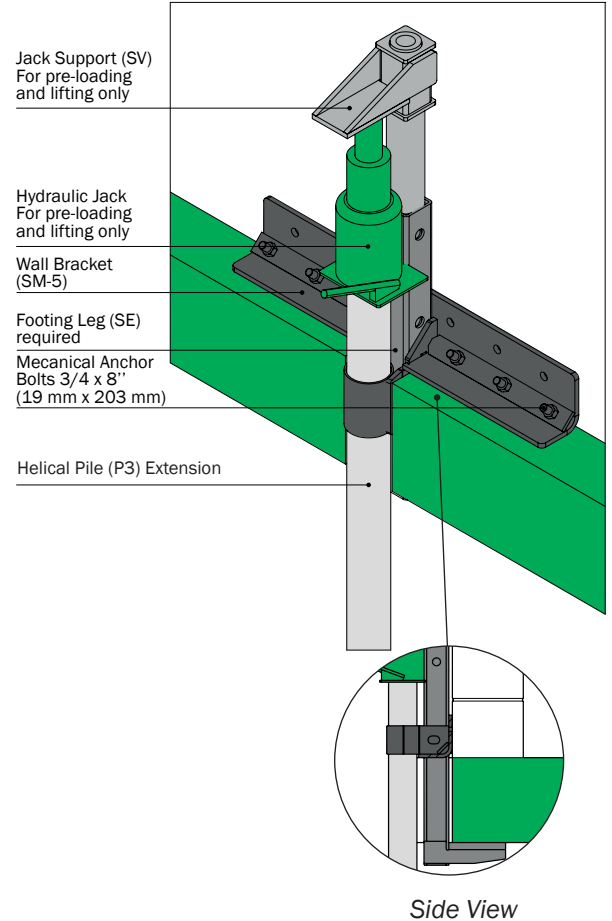
Technical Specifications

Material specifications are available upon request.

Geometry Wall Bracket (SM-5)



- Primary bolt locations
- Alternate bolt locations



Foundation Repair Brackets

Installation Instructions

1. Locate and clear all utilities.
2. Excavate in a safe manner to base of the footing.
3. Cut and chip footing back to face of wall.
4. Partially install helical pile lead section.
5. Position wall bracket and footing leg.
6. Bolt wall bracket to wall.
7. Continue helical pile installation as required to meet load.
8. Cut off pile to desired height.
9. Preload, lift as needed, and weld off all connections.

CROSS BRACINGS

2" X 1" HSS TUBING C/W HORIZONTAL TAB

Application

Cross bracing systems are used on free-standing and attached structures supported on minimum P3 shafts. Cross bracing significantly increases the load capacity and stiffness of the pair of helical foundation shafts it connects to. Cross bracing is commonly needed when the helical foundation shafts extend 2 feet or more above grade and when significant lateral loads exist (wind or seismic).

Capacity (per pair of piles)

Ultimate lateral (V_u) : 6 kips (in beam direction)

Allowable lateral (V_a) : 3 kips (in beam direction)

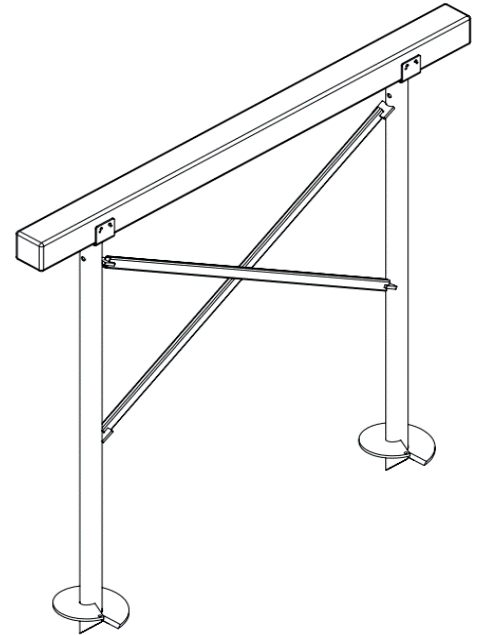
Technical Specifications

Shafts - See shaft Spec Sheets

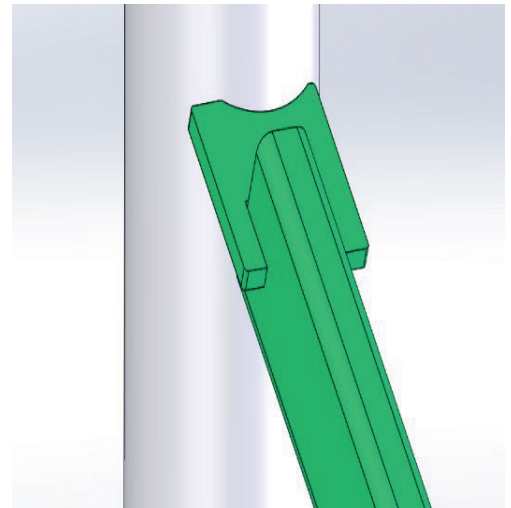
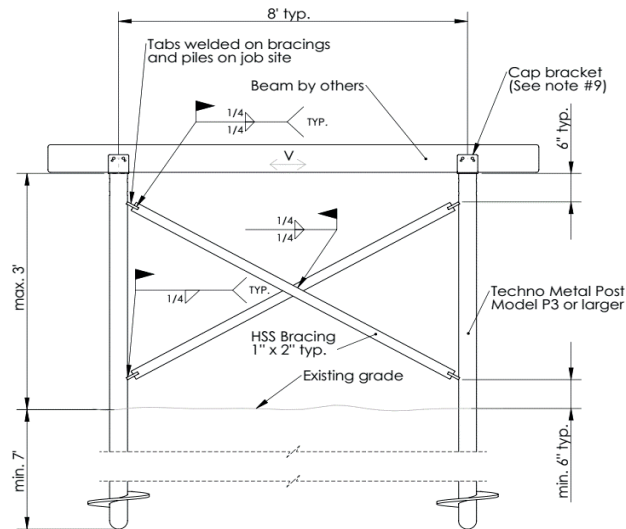
Tabs - CSA G40.21-44W - $F_y = 44$ ksi min (300 MPa)

HSS bracing - ASTM A500 gr. C - $F_y = 50$ ksi min (345 MPa)

Field Welds - E7018



Geometry - Cross Bracings



Installation instructions and special notes

- | | |
|---|--|
| 1. Install your piles until reaching a proper bearing capacity soil | 6. Weld the other end of the tabs on the side wall of the pile shaft (see figure above) |
| 2. Cut you piles at the right elevation | 7. Apply galvanizing spray paint if required. |
| 3. Measure the distance between piles outside diameter | 8. Capacity is based upon full scale load tests in loose/soft soil. Capacity is also based upon shafts extending maximum 3 feet above grade, at least 7 feet below grade, and with 8 foot on-center maximum spacing. Other configurations, including other soil types, may be modeled in LPILE and using fixed head conditions in the direction of the cross bracing. For customized systems that differ from these dimensions, the engineer should check buckling of the HSS cross bracing members. |
| 4. Cut the HSS tubing to the proper length | 9. Connection of the cap bracket to the beam may control the lateral capacity (see spec sheets for standard caps) |
| 5. Weld the tabs at each end of the HSS tubing (see figure above) | 10. Other configurations (pile type, distance above grade, etc.) should be evaluated by engineer |

ROCK ANCHOR SUPPORT

AR1-1 / 2-15M-X-N

Application

Rock Anchor Support (AR1-1/2-X) is used for uncovered one story decks when bedrock is encountered at shallow depth (less than 4 feet). AR1-1/2-X is a quick method to allow the installation of TMP extension when conventional installation of helical pile is not possible due to shallow bedrock. AR1-1/2-X can be used with R1 or R2 TMP extensions.

AR1-1/2-X may be considered for others applications such as covered decks, one story attached addition/sunroom, when approved by the project engineer.

Mechanical Capacity¹⁰

Compression	Ultimate : 22 kips (98 kN)
	Allowable : 6.7 kips (30 kN) for R1 and 11 kips (49 kN) for R2
Uplift*	Ultimate : 7 kips (31 kN)
	Allowable : 3.5 kips (15.5 kN)
Lateral (shear)*	Ultimate : 1 kips (4.5 kN)
	Allowable : 0.5 kips (2.25 kN)

Bending moment (Not Rated)

* Compression, uplift and lateral ratings may be limited by strength of bearing strata and should be confirmed by project engineer, when needed

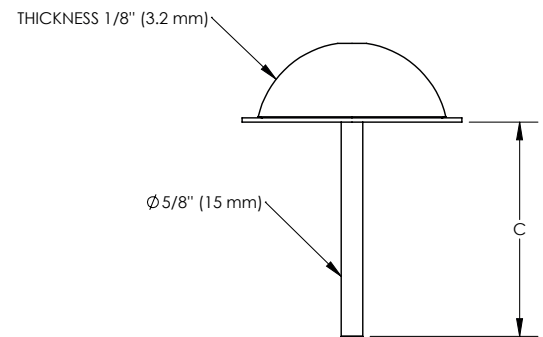
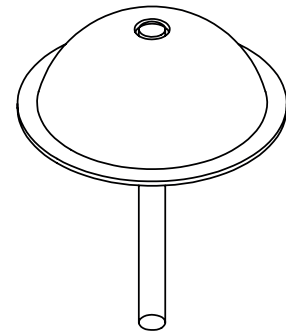
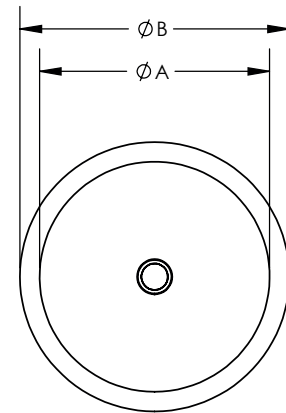
Technical Specifications

Extension - See Extension Spec Sheet

Half-sphere - CSA G40.21-44W - $F_y = 44$ ksi min (300 MPa)

Field Welds - E7018

Reinforcing dowel - CSA G30.18-58W $F_y = 58$ ksi min (400 MPa)



Dimensions

A	B	C
125 mm (5")	150 mm (6")	150 mm (6")

Rock Anchor Support

ROCK ANCHOR SUPPORT

AR1-1 / 2-15M-X-N



Allowable bearing capacity

	Maximum allowable bearing		Bearing Plate - 6" (150 mm)	
	ksf	kPa	kN	kips
IRC Table R401.4.1				
Cristalline bedrock	12	575	13.3	3.0
Foliated bedrock	4	192	4.4	1.0
NBC Table 9.4.4.1				
Sound rock	10.44	500	11.6	2.6
Clay shale	6.26	300	7.0	1.6

Values presented in the above table are based on building code provisions for presumptive bearing capacities. Higher bearing capacities may be considered with site specific engineering.

Installation instructions and special notes

1. Mark the pile position on bedrock
2. Grind the bedrock to flatten it as needed
3. Drill 3/4" hole (for 5/8" anchor diameter) into bedrock at pile location
4. Use epoxy (follow manufacturer recommendations) and insert steel dowel
5. Weld extension on top of half-sphere with a 1/4" (6 mm) weld
6. Cut the extension at proper height and install cap bracket
7. Install 2" high density insulation around pile shaft extension
8. Back fill the hole with existing ground and/or sand
9. Mechanical capacities of AR1-1/2-X are based on lab testing
10. Allowable bearing capacities based on flat bedrock (± 5 degrees)
11. Complete installation procedure available upon request

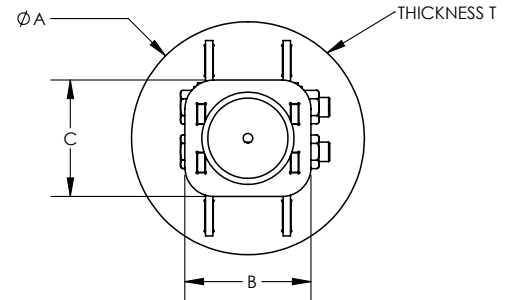
ROCK ANCHOR SUPPORT AR2-1 / 2-RX-X-X-X



Application

Rock Anchor Support (AR2-1/2-X) is used for uncovered one story decks when bedrock is encountered at shallow depth (less than 4 feet). AR2-1/2-X is a quick method to allow the installation of TMP extension when conventional installation of helical pile is not possible due to shallow bedrock. AR2-1/2-X can be used with R1 or R2 TMP extensions. AR2-1/2-X is similar to AR1-1/2-X, but do not require any on-site welding.

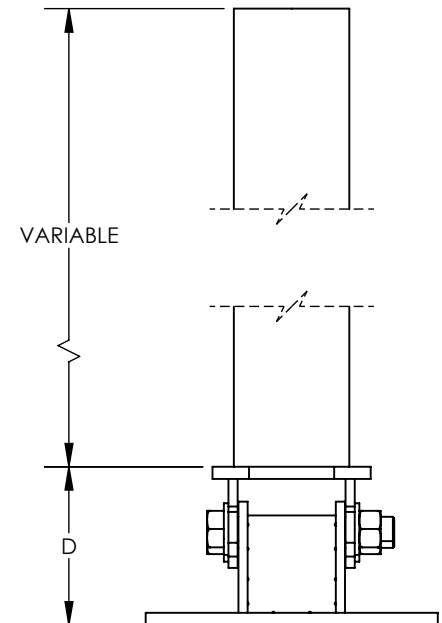
AR2-1/2-X may be considered for others applications such as covered decks, one story attached addition/sunroom, when approved by the project engineer.



Mechanical Capacity¹⁰

Compression	Ultimate : 36 kips (160 kN) Allowable : 6.7 kips (30 kN) for R1 extension and 11 kips (49 kN) for R2 extension
Uplift*	Ultimate : 8 kips (36 kN) Allowable : 4 kips (18 kN)
Lateral (shear)*	Ultimate : 2 kips (9 kN) Allowable : 1 kips (4.5 kN)
Bending moment (not rated)	

* Compression, uplift and lateral ratings may be limited by strength of bearing strata and should be confirmed by project, engineer, when needed.



Technical Specifications

Extension - See Extension Spec Sheet

Base plate - CSA G40.21-44W - Fy = 44 ksi min (300 MPa)

Bolts - SAE Grade 8 Fy = 130 ksi (896 MPa)

Field Welds - E701 Field Welds - E7018

Threaded rod - SAE Grade 2 Fy = 57 ksi min (393 MPa)

Dimensions

A	B	C	D	T
6" or 9" (150 mm or 225 mm)	3.25" (82.6 mm)	3" (76 mm)	3.25" (82.6 mm)	0.25" (6.4 mm)

Rock Anchor Support

ROCK ANCHOR SUPPORT

AR2-1 / 2-RX-X-X-X



Allowable bearing capacity

	Maximum allowable bearing pressure		Bearing Plate - 6" (150 mm) Ø		Bearing Plate - 9" (225 mm) Ø	
	ksf	kPa	kN	kips	kN	kips
IRC Table R401.4.1						
Cristalline bedrock	12	575	13.3	3.0	30.0	6.8
Foliated bedrock	4	192	4.4	1.0	10.0	2.0
NBC Table 9.4.4.1						
Sound rock	10,44	500	11.6	2.6	26.1	5.9
Clay shale	6,26	300	7.0	1.6	15.7	3.5

Values presented in the above table are based on building code provisions for presumptive bearing capacities. Higher bearing capacities may be considered with site specific engineering.

Installation instructions and special notes

1. Mark the pile position on bedrock
2. Grind the bedrock to flatten it as needed
3. Drill 7/8" hole (for 3/4" anchor diameter) into bedrock at pile location
4. Use epoxy (follow manufacturer recommendations) and insert steel threaded rod
5. Bolt extension on top of lower part
6. Cut the extension at proper height and install cap bracket
7. Install 2" high density insulation around pile shaft extension
8. Back fill the hole with existing ground and/or sand
9. Mechanical capacities of AR2-1/2-X are based on lab testing
10. Allowable bearing capacities based on flat bedrock (± 5 degrees)
11. Complete installation procedure available upon request

INSTALLATION EQUIPMENT

SPECIFICATIONS

Our mechanical engineering team designs and manufactures cutting-edge installation equipment to deliver reliable, efficient on-site installation. Our equipment also provides precision installation to ensure proper load transfer to the pile. In addition, the speed at which we install our equipment means that site delivery is unmatched. Our installation equipment is only available through the TMP network.



EM1

Dimensions : 93" x 48" x 66" (2,362 mm x 1,219 mm x 1,676 mm)

Weight : 4,464 lbs (2,025 kg)

Maximum mast height : 145" (3,683 mm)

Mast rotation : 360°

Minimum clearance required for installation : 8" (203 mm)

Maximum compressive bearing capacity per installed pile : ± 150 kN

Maximum torque : ± 9,000 ft-lb



EM2

Dimensions : 106" x 48" x 68" (2,692 mm x 1,219 mm x 1,727 mm)

Weight : 6,000 lbs (2,722 kg)

Maximum mast height : 147" (3,733 mm)

Mast rotation : 360°

Minimum clearance required for installation : 8" (203 mm)

Maximum compressive bearing capacity per installed pile : ± 150 kN

Maximum torque : ± 9,000 ft-lb



R2D

Dimensions : 98 ½" x 29" x 59" (2,500 mm x 760 mm x 1,500 mm)

Weight : 1 653 lbs (750 kg)

Maximum mast height : 133 ⅞" (3,400 mm)

Mast rotation : ± 60°

Minimum clearance required for installation : 7" (178 mm)

Maximum compressive bearing capacity per installed pile : ± 115 kN

Maximum torque : ± 5,500 ft-lb



ET1

Dimensions : 168" x 68" x 84" (4,267 mm x 1,727 mm x 2,133 mm)

Weight : 8,900 lbs (4,572 kg)

Maximum mast height : 180" (4,572 mm)

Mast rotation : 360°

Minimum clearance required for installation : 9" (229 mm)

Maximum compressive bearing capacity per installed pile : ± 225 kN

Maximum torque : ± 14,500 ft-lb





