

# CHANCE® Type RS4500.337 Helical Piles per ICC-ES AC358 for Building Code Evaluation

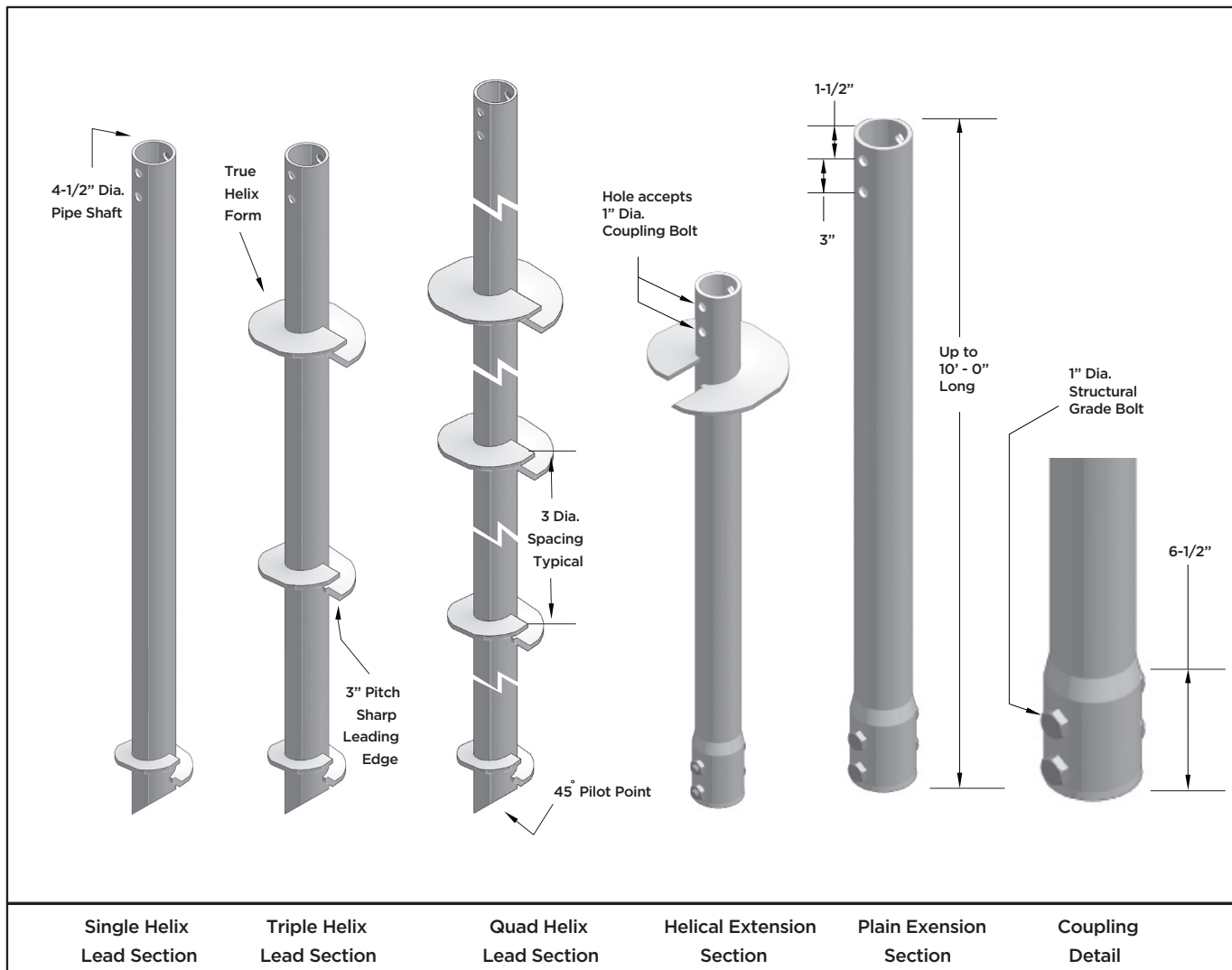
136.1 kip Ultimate – 68.1 kip Allowable Capacity

Installation Torque Rating – 24,300 ft-lb

Multi-Purpose 4-1/2" Diameter, 0.337" Wall, Round HSS Shaft with integrally formed upset sockets

## Description:

Hubbell Power Systems, Inc., CHANCE Type RS4500.337 Helical Piles have 136.1 kip ultimate capacity and 68.1 kip working or allowable capacity in compression or tension. This capacity is based on well documented correlations with installation torque, which is recognized as one method to determine capacity per IBC Section 1810.3.3.1.9. Lead sections and extensions couple together to extend the helix bearing plates to the required load bearing stratum. Round shaft helical piles offer increased lateral and buckling resistance compared to solid square shafts with similar torque strength. Strength calculations are based on a design corrosion level of 50 years for most soil conditions. CHANCE Type RS Helical Piles can be coupled with square shaft lead sections (Combo Piles) to provide greater penetration into bearing soils. CHANCE Type RS Helical Piles and Anchors feature sharpened leading edge helix plates that are circular in plan to provide uniform load bearing in most soil conditions. Helix plates can be equipped with “sea-shell” cuts on the leading edge to enhance penetration through dense soils with occasional cobbles and debris. Custom lengths and helix configurations are available upon request. See below for additional information and other sections of this Technical Manual for specifications and design details.



All Hubbell Power Systems, Inc. CHANCE Helical Products are MADE IN THE U.S.A.

# RS4500.337 Building Code Helical Pile Specifications & Available Configurations

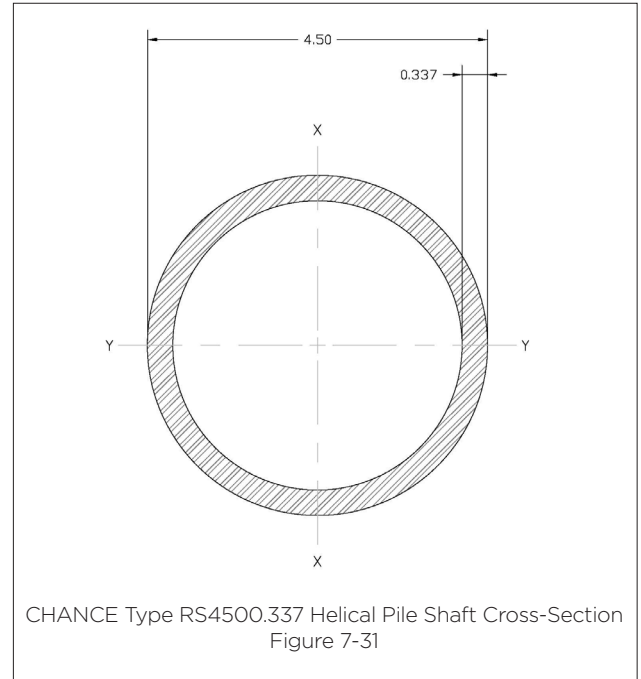
**Shaft** - HSS 4-1/2 inch OD x 0.337 inch (schedule 80) wall steel shaft produced exclusively for CHANCE products.

**Coupling** - forged as an integral part of the plain and helical extension material as round deep sockets connected with multiple structural bolts.

**Helix** - 1/2 inch Thick: ASTM A572, or A1018, or A656 with minimum yield strength of 80 ksi.

**3 inch Helix Pitch** - a Standard established by Hubbell Power Systems, Inc. for CHANCE Helical Piles and Anchors. Available Helix Diameters: 8, 10, 12, 14, 16, or 20 inches. All helix plates are spaced 3 times the diameter of the preceding (lower) helix unless otherwise specified. The Standard helix plate has straight sharpened leading edges or can be ordered with a "sea shell" cut. The "sea shell" cut is best suited when it is necessary to penetrate soils with fill debris, cobbles, or fractured rock.

**Configurations:**  
 Single, double, triple, and quad helix Lead Sections, 7 and 10 feet long  
 Plain Extensions, 3, 5, 7, and 10 feet long  
 Extensions with Helix Plates, 5, 7 and 10 feet long  
 Helical products are Hot Dip Galvanized per ASTM A123 Grade 75.



*NOTE: Helical piles shall be installed to appropriate depth in suitable bearing stratum as determined by the geotechnical engineer or local jurisdictional authority. Torque correlated capacities are based on installing the pile to its torque rating, using consistent rate of advance and RPM. A minimum factor of safety of 2 is recommended for determining allowable capacity from correlations. Deflections of 0.25 to 0.50 inches are typical at allowable capacity.*

## Nominal, LRFD Design and ASD Allowable Strengths of RS4500.337 Helix Plates for Shaft Axial Tension and Compression<sup>1</sup>

Helix Diameter in (mm)	Thickness in (mm)	Nominal Strength kip (kN)	LRFD Design Strength kip (kN)	ASD Allowable Strength kip (kN)
8 (200)	0.5 (13)	180.2 (801.6)	135.2 (601.4)	90.2 (401.2)
10 (250)	0.5 (13)	180.2 (801.6)	135.2 (601.4)	90.2 (401.2)
12 (300)	0.5 (13)	180.2 (801.6)	135.2 (601.4)	90.2 (401.2)
14 (350)	0.5 (13)	180.2 (801.6)	135.2 (601.4)	90.2 (401.2)

For SI: 1 kip = 4.448 kN.

<sup>1</sup>Capacities based on a design corrosion level of 50-years.

## Nominal and LRFD Design Compression Strengths of CHANCE® Type RS4500.337 Helical Pile Lead & Extension Sections<sup>1,2,3</sup>

Section Type & Helix Count	Nominal & LRFD Design Compression Strengths kips (kN)							
	Firm Soil				Soft Soil			
	Fixed		Pinned		Fixed		Pinned	
	Nominal	Design <sup>3</sup>	Nominal	Design <sup>3</sup>	Nominal	Design <sup>3</sup>	Nominal	Design
Lead, Single Helix	See Helix Strength Table Above				175.3 (779.8)		156.3 (695.3)	
Lead, Multi-Helix	191.7 (852.7)	145.33 (646.5)	186.3 (828.7)	145.33 (646.57)	175.3 (779.8)	145.33 (646.57)	156.3 (695.3)	140.67 (625.7)
Extension								

For SI: 1 kip = 4.448 kN.

<sup>1</sup> Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

<sup>2</sup> Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

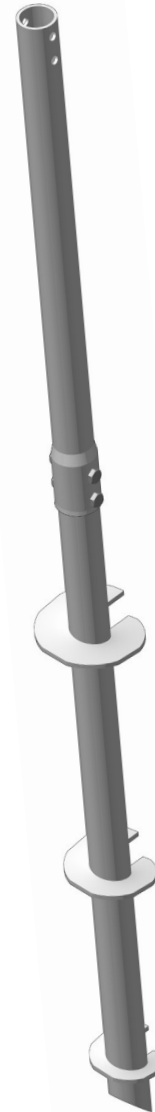
<sup>3</sup> Limited by Coupling Bolt Shear

**RS4500.337 HELICAL PILE AND ANCHOR PRODUCT SPECIFICATIONS**

SHAFT	Hot Rolled HSS 4 inch Nominal Schedule 80 (0.337 inch nominal wall) per ASTM A500 Grade B/C with 50 ksi minimum yield strength			
Shaft Size, OD	4.5 in	114 mm	Corroded	
			4.487 in	114 mm
Shaft Size, ID*	3.874 in	98.4 mm	Corroded	
			3.886 in	98.7 mm
Moment of Inertia (I)*	9.07 in <sup>4</sup>	377.5 cm <sup>4</sup>	Corroded	
			8.701 in <sup>4</sup>	362.2 cm <sup>4</sup>
Shaft Area (A)*	4.12 in <sup>2</sup>	26.6 cm <sup>2</sup>	Corroded	
			3.951 in <sup>2</sup>	25.5 cm <sup>2</sup>
Section Modulus (S <sub>x-x</sub> )*	4.03 in <sup>3</sup>	66.1 cm <sup>3</sup>	Corroded	
			3.878 in <sup>3</sup>	63.6 cm <sup>3</sup>
Perimeter	14.1 in	35.9 cm	Corroded	
			14.09 in	35.8 cm
Coupling	Integral Forged Round Deep Socket Sleeve			
Coupling Bolts	Two 1 in Dia. ASTM A193 Grade B7 Hex Head Bolts			
Helix Plates	0.5 inch Thick, Formed on Matching Metal Dies, ASTM A572 Grade 80 or better			
Coatings	Hot Dip Galvanized per ASTM A123 Grade 75, 3.0 mil minimum thickness or Bare Steel			
<b>TORQUE PROPERTIES</b>				
Torque Correlation Factor <sup>†</sup>	5.6 ft <sup>-1</sup>		18.5 m <sup>-1</sup>	
Torque Rating	24,300 ft-lb		32,946 N-m	
<b>STRUCTURAL CAPACITY</b>				
Tension Strength	Nominal		LRFD Design	
	150 kip	667.2 kN	112.5 kip	500.2 kN
Allowable Tension Strength	75 kip		333.6 kN	
<b>TORQUE CORRELATED CAPACITY</b>				
Capacity Limit Based on Torque Correlation, Tension / Compression	Ultimate		Allowable	
	136.1 kip	605.4 kN	68.1 kip	302.9 kN

\* computed with 93% of wall thickness per AISC 360-10, B4.2

† per ICC-ES AC358 Section 3.13.1.1


 Assembly of RS4500.337  
Figure 7-32

**ASD Allowable Compression Strengths of CHANCE<sup>®</sup> Type RS4500.337 Helical Pile Lead & Extension Sections<sup>1,2,3</sup>**

Section Type & Helix Count	ASD Allowable Axial Compression Strength kips (kN)			
	Firm Soil		Soft Soil	
	Fixed	Pinned	Fixed	Pinned
Lead, Single Helix	See Helix Strength Table Above for 8", 10", 12" & 14"	See Helix Strength Table Above for 8", 10", 12" & 14"	See Helix Strength Table Above for 8", 10", 12" & 14"	See Helix Strength Table Above for 8", 10", 12" & 14"
Lead, 2-Helix 8"-10"	96.9 (431)	96.9 (431)	96.9 (431)	93.6 (416.4)
Lead, 2-Helix 10"-12"				
Lead, 2-Helix 12"-14"				
Lead, 2-Helix 14"-14"				
Lead, Multi-Helix	96.9 (431)	96.9 (431)	96.9 (431)	93.6 (416.4)
Extension	96.9 (431)	96.9 (431)	96.9 (431)	93.6 (416.4)

For SI: 1 kip = 4.448 kN.

<sup>1</sup> Refer to Section 4.1.3 of ESR-2794 for descriptions of fixed condition, pinned condition, soft soil and firm soil.

<sup>2</sup> Strength ratings are based on a design corrosion level of 50-years and presume the supported structure is braced in accordance with IBC Section 1808.2.5, and the lead section with which the extension is used will provide sufficient helix capacity to develop the full shaft capacity.

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