

CHANCE® Helical Piles

Installation Instructions

These products must be installed by Contractors, certified by Hubbell Power Systems, Inc. (HPS)

NOTICE: The following suggested instructions are written as a guide to assist the specifier in writing his own specifications. Specific circumstances involving the structure, the soils and other factors must be considered on each project to assure an adequate installation specification. Please consult local building codes and authorities to ascertain and verify compliance to their rules, regulations and requirements.

HPS shall not be responsible or liable for the adoption, revision, implementation, use or misuse of these suggested installation instructions. HPS' sole responsibility shall be with respect to CHANCE brand products, and any such responsibility shall be subject to and limited by the Terms & Conditions set forth in HPS' SCS Policy Sheet as amended.



Hubbell has a policy of continuous product improvement. Please visit hubbellpowersystems.com to confirm current design specifications.

GENERAL

The CHANCE helical pile shall be installed by authorized CHANCE Contractors. These Contractors shall have satisfied the certification requirements relating to the technical aspects of the product and the ascribed installation techniques.

All work as described herein shall be performed in accordance with all applicable safety codes in effect at the time of installation.

The Contractor shall employ skilled, experienced work forces who are familiar with the requirements and methods necessary for proper performance of the work as outlined in these specifications.

HELICAL PILE LOCATION

It is the responsibility of the contractor to determine the location of, and avoid contacting, underground utilities (gas, electricity, water, telephone, TV, etc.).

Helical piles should be installed as shown on the Engineer's Documents. If the Engineer's Documents are not available, then the contractor shall submit a written document to the owner or owner's representative.

Engineer's Document shall include, but is not limited to the following:

- Total number of helical piles
- Locations of the individual helical piles
- Size and number of helices per helical pile
- Minimum installed depth of the helical pile
- Minimum effective installation torque of the helical pile. The effective torque is the torque value averaged over the last 3-feet (900 mm) of installation in 1-foot (300 mm) intervals
- If testing is required, see Helical Pile Testing section

HELICAL PILE SELECTION

The lead sections with helices and extension sections shall be manufactured by Hubbell Power Systems, Inc. and as shown on attached drawings.

All units shall conform to the material specifications as referenced on these instructions.

The number and sizes of helices, and the shaft size of helical pile shall be as shown on the Engineer's Documents.

Soil strength shall be determined by either a soil boring with a Standard Penetration Test, by installing a helical pile while monitoring and recording installation torque or other methods approved by the engineer. The data acquired along with other information available about the site shall be used in determining the best helical pile.

INSTALLATION EQUIPMENT

Installing Units

- Installation unit shall consist of rotary type torque motor with forward and reverse capabilities
- These units shall be capable of developing the minimum torque as required by the Engineer's Documents
- These units shall be capable of positioning the helical pile at the required installation angle depending upon the application
- These units shall be in good working condition and capable of being operated in a safe manner

Installation Tooling

- Adapters approved by the Engineer of Record shall be employed to safely connect the installation units to the helical piles and extensions
- These adapters shall have torque capacity ratings at least equal to the minimum ultimate torque rating of the helical pile as specified for the project
- These adapters shall be securely connected to the helical pile during installation so as to prevent accidental separation



RS Drive Tool



SS Drive Tool



Torque Indicator

Drive tools and torque indicators are available from HPS.

Torque Monitoring Devices

- The torque being applied by the installing units shall be monitored and recorded throughout the installation process
- Torque monitoring devices shall be either a part of the installing unit or an independent device in-line with the installing unit. Calibration data for either unit shall be available for review by the owner or owner's representative

INSTALLATION PROCEDURES

It is the responsibility of the contractor to determine the location of, and avoid contacting, underground utilities (gas, electricity, water, telephone, TV, etc.).

The helical pile shall be positioned as shown on the Engineer's Document. Proper angular alignment shall be established at the start of installation.

The helical pile shall be installed in a smooth, continuous manner. The rate of helical pile rotation shall be in the range of 5 to 20 revolutions per minute.

Sufficient down pressure shall be applied to advance the helical pile at 2.5 to 3 inches (60 to 75 mm) per revolution.

Plain extension material may be required to position the helical pile at the depth required by the Engineer's Documents. Extensions shall be coupled to the helical pile using the bolts provided with the extension. These bolts shall be installed and tightened to approximately 40 ft-lb (54 Nm) of torque.

Installation torque shall be monitored and recorded throughout the installation process.

If underground obstructions are encountered during installation, the Contractor shall have the option of removing the obstruction if possible or relocating the helical pile. This latter option may require the relocation of adjacent helical piles or installing additional helical piles.

TERMINATION OF INSTALLATION

The maximum installation torque shall at no time exceed the torque rating of the helical pile shaft as specified for the project.

The helical pile shall be installed to the minimum effective torque value as shown on the Engineer's Documents. *If the Engineer's Document cannot be followed, the approval of the Engineer of Record shall be obtained before option b or c is implemented.* If the minimum torque requirement has not been satisfied at the minimum depth level, the Contractor shall have the following options:

- A. Install the helical pile deeper using additional plain extension material until the specified torque level is obtained, or
- B. Remove the existing helical pile and install a helical pile with larger and/or more helices. This revised helical pile shall be installed at least three 3-feet (0.9 m) beyond the termination depth of the original helical pile, or
- C. Add an additional helical pile. The minimum depth of installation shall be as shown on the Engineer's Document. If the installer cannot achieve the minimum depth, the engineer shall be contacted before proceeding further.

If the maximum torque rating of the installing unit has been reached but that of the helical pile has not prior to satisfying the minimum depth requirement, the Contractor shall have the option of utilizing a higher torque installing unit meeting the requirement of INSTALLATION PROCEDURES to drive the helical pile deeper.

If the minimum torque rating of the helical pile and/or installing unit has been reached prior to satisfying the minimum depth level, the Contractor shall have the following options:

The approval of the Engineer of Record shall be obtained before the following Option A or B, is implemented.

- A. Terminate the installation at the depth obtained, or
- B. Remove the existing helical pile and install a helical pile with smaller and/or fewer helices. This revised helical pile shall be installed at least 3-feet (0.9 m) beyond the termination depth of the original helical pile

CONNECTION OF THE HELICAL PILE TO THE STRUCTURE

The CHANCE helical pile shall be connected to the structure using an approved CHANCE steel adapter or properly designed pile cap capable of safely transferring the structural loads to the helical pile.

INSTALLATION RECORDS

Written installation records shall be maintained for each helical pile.

These records shall include, but are not limited to the following:

- Project name and/or location
 - Name of authorized CHANCE Contractor
 - Name of Contractor's foreman or representative who witnessed the installation
 - Date and time of installation
 - Location and reference number of helical pile
 - Descriptions of lead section and extensions installed
 - Overall depth of installation as referenced from bottom of grade beam or footing
 - Torque readings for the last 3-feet (0.9 m) of installation at 1-foot (0.3 m) intervals if practical
- In lieu of this requirement, the termination torque shall be recorded as a minimum***
- Any other applicable information relating to the installation

HELICAL PILE TESTING

Testing shall be required only if specified on the Engineer's Documents or if deemed necessary by the Engineer of Record due to unusual subsurface conditions.

Testing, if required, shall be performed in accordance with the test plan contained in the Engineer's Documents or, if required by the Engineer of Record due to unusual subsurface conditions, in accordance with the test plan set forth by the Engineer of Record prior to the beginning of the test.

The test plan shall include, but not be limited to, the following:

- The number and locations of tests, based on site and subsurface conditions
- The maximum load to be applied during the test
- The acceptance criteria including load versus displacement

The test equipment shall be capable of applying a compression or tension load equal to the maximum test load specified in the test plan. If the compression test requires additional helical piers for reaction, these helical piles shall be installed to the same torque requirements as the test helical pile.

The helical pile shall be tested to the greater of the safety factored load or its ultimate capacity, defined as the maximum load the helical pile can resist at continuous creep conditions.

Test records shall include the following:

- Items as outlined in INSTALLATION RECORDS of this Specification
- Magnitudes of applied loads and corresponding displacements

Material Specifications: CHANCE® Helical Piles

SS5, SS150 - 1-1/2-inch (38mm) Square Shaft

SS175 - 1-3/4-inch (44mm) Square Shaft

RS2875 - 2.875-inch (73mm) Round Shaft

RS3500 - 3.50-inch (89 mm) Round Shaft

RS4500 - 4.5-inch (114 mm) Round Shaft

HELIX BEARING PLATE:

- SS5, RS2875.203 - Hot rolled carbon steel sheet, strip, or plate per ASTM A572, with minimum yield strength of 50 ksi (345 MPa). Plate thickness is 3/8-inches (9.5 mm)
- SS150, SS175, RS2875.276 - Hot rolled steel sheet, strip, or plate per ASTM A656 with minimum yield strength of 80 ksi (552 MPa). Plate thickness is 3/8-inch (9.5 mm)
- SS200, SS225, RS4500.237, RS4500.337 - Hot rolled steel sheet, strip, or plate per ASTM A656 with minimum yield strength of 80 ksi (552 MPa). Plate thickness is 1/2-inch (12.7 mm)
- RS3500.300 - Hot rolled carbon steel sheet, strip, or plate per ASTM A572, with minimum yield strength of 50 ksi (345 MPa). Plate thickness is 1/2-inches (12.7 mm)
- Helix bearing plates are formed on matching metal dies to true helical shape
- RS4500.237 & RS4500.337 - Hot rolled carbon steel sheet, strip, or plate per ASTM A656, with minimum yield strength of 80 ksi (345 mPa). Plate thickness is ½-inches (12.7 mm)

HELICAL PILE SHAFT:

- SS5 - 1-1/2" (38 mm) solid steel hot rolled square shaft conforming to the general requirements of ASTM A29; modified AISI 1044 with minimum yield strength 70 ksi (483 MPa), medium carbon steel grade with improved strength due to fine grain size
- SS150 (1-1/2-inch (38 mm) solid steel shaft)
- SS175 (1-3/4-inch (44 mm) solid steel shaft)
- SS200 (2-inch (51 mm) solid steel shaft)
- SS225 (2-1/4-inch (57 mm) solid steel shaft)

Hot rolled square shaft conforming to the general requirements of ASTM A29; modified AISI 1530 with minimum yield strength 90 ksi (620 MPa). High Strength Low Alloy (HSLA), low to medium carbon steel grade with improved strength due to fine grain size.

SS Helical Pile Type	Torque Rating ft-lb (Nm)	Ultimate Tension (Mechanical Strength) kips (kN)
SS5	5,700 (7,730)	70 (312)
SS150	7,000 (9,500)	70 (312)
SS175	10,500 (14,200)	100 (445)
SS200	16,000 (21,700)	150 (668)
SS225	21,000 (28,500)	200 (890)



Type SS Helical Pile

- RS287.203, 2.875-inch (73 mm) OD x 0.203 (5.2 mm) wall, 2.5-inch schedule 40 Pipe
- RS2875.276, 2.875-inch (73 mm) OD x 0.276 (7.0 mm) wall, 2.5-inch schedule 80 Pipe
- RS3500.300, 3.500-inch (89 mm) OD x 0.300 (7.6 mm) wall, 3-inch schedule 80 Pipe
- RS4500.237, 4.500-inch (114 mm) OD x 0.237 (6.0 mm) wall, 4-inch schedule 40 Pipe.
- RS4500.337, 4.500-inch (114 mm) OD x 0.337 (8.6 mm) wall, 4-inch schedule 80 Pipe.

Structural steel tube or pipe, welded in compliance with ASTM A500 with minimum yield strength 50 ksi (345 MPa).

RS Helical Pile Type	Torque Rating ft-lb (Nm)	Ultimate Tension (Mechanical Strength) kips (kN)
RS2875.203	5,500 (7,500)	60 (267)
RS2875.276	8,000 (10,800)	90 (400)
RS3500.300	13,000 (17,600)	120 (534)
RS4500.237	17,000 (23,000)	
RS4500.337	25,000 (33,900)	



Type RS Helical Pile

COUPLING BOLTS:

- SS5, SS150 -3/4-inch (19 mm) diameter ASTM A325 Type 1, hex head bolt
- SS175 -7/8-inch (22 mm) diameter ASTM A193 Grade B7, hex head bolt
- SS200 -1-1/8-inch diameter ASTM A193 Grade B7, hex head bolt
- SS225 -1-1/4-inch diameter ASTM A193 Grade B7, hex head bolt
- RS2875.203, RS2875.276, RS3500.300 -3/4-inch (19 mm) diameter SAE J429 Grade 5 hex head bolt
- RS4500.237, RS4500.337 -1-inch diameter ASTM A193 Grade B7, hex head bolt.

Threads excluded from shear plane for all helical piles

EXTENSION SECTION COUPLINGS:

Square Shaft (SS)

Shall be formed as integral part of the plain extension shaft material. For SS material, couplings shall be hot forged deep sockets.

Round Shaft (RS)

Shall be formed as integral part of the plain extension shaft material. For RS material, couplings shall be either hot or cold expanded deep sockets.

WELDING:

- All welding shall be in accordance with AWS D1.1, latest revision
- All welders shall be certified to AWS specifications

FINISH:

- All material shall be hot-dipped galvanized in accordance with ASTM A153 after fabrication



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Printed in the U.S.A. | TD_04_203_E

