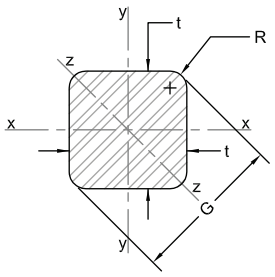
HA175 Shaft Specifications & Capacities

Shaft Material:
1.75" round corner square bar
ASTM A29
Yield strength = 90 ksi (min)
Tensile strength = 115 ksi (min)

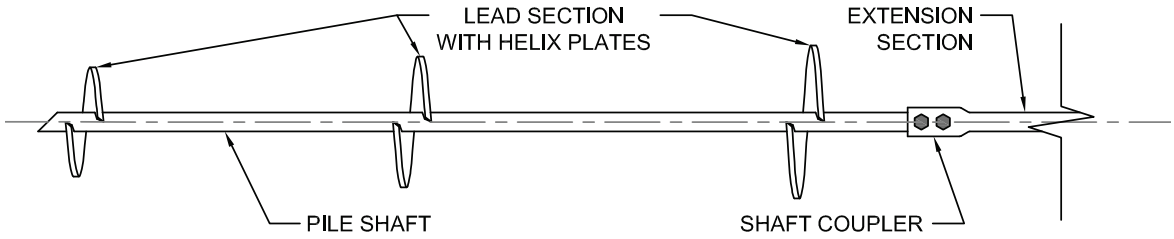
Helix Plates:
ASTM A572 Grade 50
⅜" thick (standard)
½" thick (available)
Helix plate geometry conforming to ICC-ES AC358

Shaft Coupling Hardware:
(2) - Ø¾" Grade 8 bolts with nuts
Mechanically galvanized per ASTM B695

Surface Finish of Shaft Segments:
Available plain or hot-dip galvanized[2]



	Plain	Plain Corroded[1]	Galvanized Corroded[1,2]
t (in)	1.750	1.714	1.740
G (in)	2.268	2.232	2.258
R (in)	0.250	0.232	0.245
A (in²)	3.01	2.89	2.98
I_x, I_y (in⁴)	0.75	0.69	0.73
I_z (in⁴)	0.75	0.69	0.73
S_x, S_y (in³)	0.85	0.80	0.84
S_z (in³)	0.66	0.62	0.65
Z_x, Z_y (in³)	1.30	1.22	1.27
Z_z (in³)	1.23	1.16	1.21
r_x, r_y (in)	0.50	0.49	0.50
r_z (in)	0.50	0.49	0.50
Shaft Max Allowable Compression Capacity[3,4] P_n/Ω (kips)	**59.6**	**54.1**	**54.2**
Shaft Max Allowable Tension Capacity[4] P_n/Ω (kips)	**59.6**	**54.1**	**54.2**



Default Torque Correlation Factor[5] K_t = 10 (ft^{-1})	**Maximum Ultimate Soil Capacity[6] Q_u = 100.0 (kips)**
Maximum Installation Torque T = 10,000 (ft-lb)	**Maximum Allowable Soil Capacity[6] Q_a = 50.0 (kips) FOS = 2.0**

(1) Corroded properties and capacities include a 50-year scheduled sacrificial loss in thickness per ICC-ES AC358.

(2) Hot-dip galvanized coating in accordance with ASTM A123.

(3) Square shaft piles may be considered for compression applications in soil profiles that offer sufficient continuous lateral support; e.g., in soils with SPT N-values ≥ 10. In profiles or conditions that limit pile stability, buckling analyses should be considered by the project engineer, taking into account discontinuities and potential eccentricities created by the couplers.

(4) Listed mechanical capacities are for the shaft and coupled connections only. System capacity should also not exceed the installed allowable torque-correlated soil capacity or the allowable capacity of the respective bracket (see additional bracket tables).

(5) Default K_t factor is consistent with that listed in ICC-ES AC358. This value is generally conservative. Site-specific K_t factors can be determined for a given project with full-scale load testing.

(6) Soil capacities listed are at maximum installation torque. Ultimate soil capacity is based on the equation $Q_u = K_t \times T$. Allowable soil capacity is obtained by dividing the ultimate capacity by an appropriate factor of safety ($Q_a = Q_u / FOS$). Although a factor of safety of 2.0 is commonly used, a higher or lower factor of safety may be considered at the discretion of the helical pile designer or as dictated by local code requirements. System capacity should also not exceed the mechanical capacity of the shaft or those listed in the respective bracket capacity tables.

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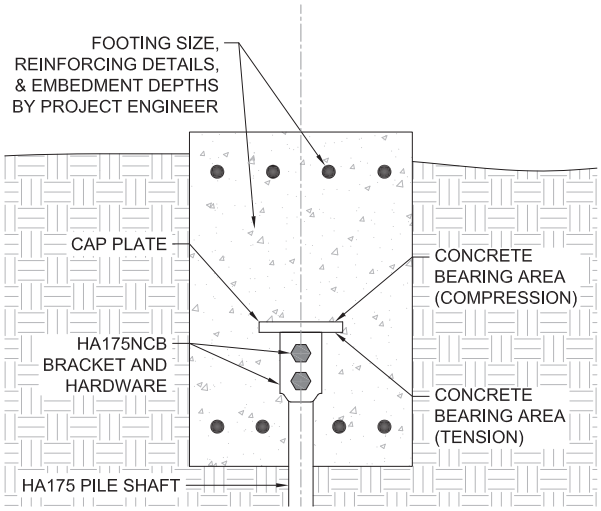
HA175NCB Bracket Specifications & Capacities when used with the HA175 Helical Pile System

Bracket Sleeve Material:
Ø3.000" x 0.313" wall
ASTM A513 Type 5 Grade 1026
Yield strength = 70 ksi (min)
Tensile strength = 80 ksi (min)

Cap Plate Material:
¾" x 6.00" square
ASTM A36

Bracket Hardware:
(2) - Ø¾" Grade 8 bolts with nuts
Mechanically galvanized per ASTM B695

Bracket Finish:
Available plain or hot-dip galvanized[2]



Concrete Bearing Area[6] (Compression) = 36.0 in²
Concrete Bearing Area[6] (Tension) = 28.9 in²

		Allowable Bracket Capacity[4] R_n/Ω			
		Compression[3] (kips)	Concrete Bearing[6] (ksi)	Tension (kips)	Concrete Bearing[6] (ksi)
2 Bolts	Plain	59.2	1.64	54.3	1.88
	Plain Corroded[1]	49.8	1.40	48.7	1.71
	Galvanized Corroded[1,2]	54.2	1.51	52.7	1.83
1 Bolt	Plain	29.6	0.82	29.6	1.02
	Plain Corroded[1]	24.9	0.70	24.9	0.87
	Galvanized Corroded[1,2]	27.1	0.76	27.1	0.94
0 Bolts[5]	Plain	46.5	1.29	0	0
	Plain Corroded[1]	42.4	1.19	0	0
	Galvanized Corroded[1,2]	45.4	1.26	0	0

(1) Corroded capacities include a 50-year scheduled sacrificial loss in thickness per ICC-ES AC358.

(2) Hot-dip galvanized coating in accordance with ASTM A123.

(3) Square shaft piles may be considered for compression applications in soil profiles that offer sufficient continuous lateral support; e.g., in soils with SPT N-values ≥ 10. In profiles or conditions that limit pile stability, buckling analyses should be considered by the project engineer, taking into account discontinuities and potential eccentricities created by the couplers.

(4) Listed capacities include limiting mechanical capacities of the shaft when the shaft and bracket are combined as a system. System capacity should also not exceed the installed allowable torque-correlated soil capacity (See Shaft Specifications & Capacities).

(5) Applications utilizing no bolts should either be tack welded or utilize some other mechanism to immobilize the bracket and maintain firm contact between the cap plate and pile shaft throughout construction and concrete placement.

(6) Concrete bearing values provided are the uniform bearing stresses required to achieve the full corresponding bracket capacity. Allowable concrete bearing is a function of several project specific variables including depth of embedment, edge distance, and concrete compressive strength (f'_c). When allowable concrete bearing stresses are lower than these values, corresponding bracket capacities can be obtained by multiplying the actual allowable concrete bearing stress by the respective bearing areas provided, but should not exceed the capacities listed in this table. Other concrete design checks including shear, bending, and punching of the supported structure are also project specific and shall be the responsibility of the project engineer.

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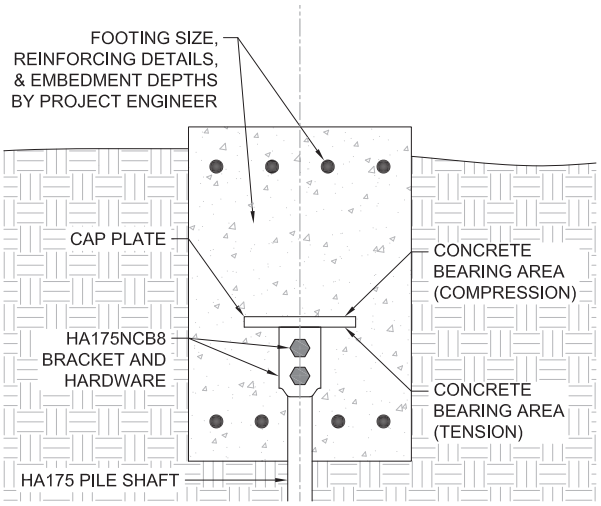
HA175NCB8 Bracket Specifications & Capacities when used with the HA175 Helical Pile System

Bracket Sleeve Material:
Ø3.000" x 0.313" wall
ASTM A513 Type 5 Grade 1026
Yield strength = 70 ksi (min)
Tensile strength = 80 ksi (min)

Cap Plate Material:
¾" x 8.00" square
ASTM A36

Bracket Hardware:
(2) - Ø¾" Grade 8 bolts with nuts
Mechanically galvanized per ASTM B695

Bracket Finish:
Available plain or hot-dip galvanized[2]



Concrete Bearing Area[6] (Compression) = 64.0 in²
Concrete Bearing Area[6] (Tension) = 56.9 in²

		Allowable Bracket Capacity[4] R_n/Ω			
		Compression[3] (kips)	Concrete Bearing[6] (ksi)	Tension (kips)	Concrete Bearing[6] (ksi)
2 Bolts	Plain	49.6	0.78	44.2	0.78
	Plain Corroded[1]	44.7	0.70	39.7	0.70
	Galvanized Corroded[1,2]	48.2	0.76	42.9	0.76
1 Bolt	Plain	29.6	0.46	29.6	0.52
	Plain Corroded[1]	24.9	0.39	24.9	0.44
	Galvanized Corroded[1,2]	27.1	0.42	27.1	0.48
0 Bolts[5]	Plain	38.8	0.61	0	0
	Plain Corroded[1]	35.2	0.56	0	0
	Galvanized Corroded[1,2]	37.8	0.59	0	0

(1) Corroded capacities include a 50-year scheduled sacrificial loss in thickness per ICC-ES AC358.

(2) Hot-dip galvanized coating in accordance with ASTM A123.

(3) Square shaft piles may be considered for compression applications in soil profiles that offer sufficient continuous lateral support; e.g., in soils with SPT N-values ≥ 10. In profiles or conditions that limit pile stability, buckling analyses should be considered by the project engineer, taking into account discontinuities and potential eccentricities created by the couplers.

(4) Listed capacities include limiting mechanical capacities of the shaft when the shaft and bracket are combined as a system. System capacity should also not exceed the installed allowable torque-correlated soil capacity (See Shaft Specifications & Capacities).

(5) Applications utilizing no bolts should either be tack welded or utilize some other mechanism to immobilize the bracket and maintain firm contact between the cap plate and pile shaft throughout construction and concrete placement.

(6) Concrete bearing values provided are the uniform bearing stresses required to achieve the full corresponding bracket capacity. Allowable concrete bearing is a function of several project specific variables including depth of embedment, edge distance, and concrete compressive strength (f'_c). When allowable concrete bearing stresses are lower than these values, corresponding bracket capacities can be obtained by multiplying the actual allowable concrete bearing stress by the respective bearing areas provided, but should not exceed the capacities listed in this table. Other concrete design checks including shear, bending, and punching of the supported structure are also project specific and shall be the responsibility of the project engineer.

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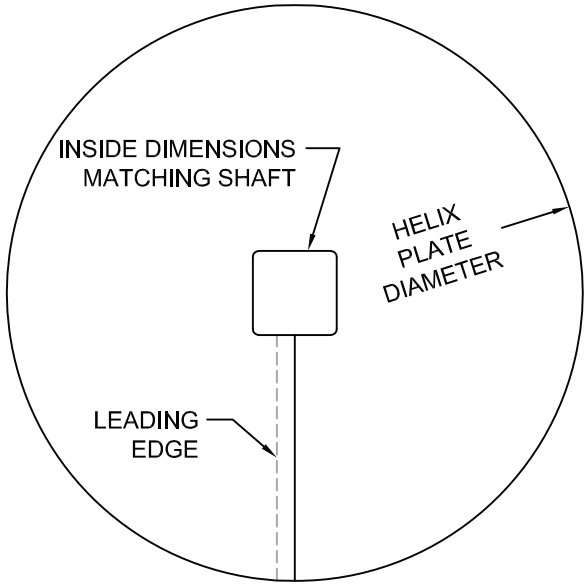
HA175 Helix Plate Net Bearing Areas

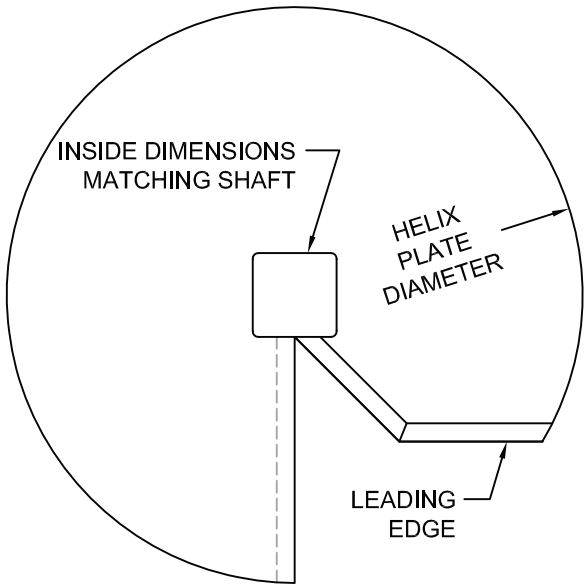
H-Style Plates

Plate Diameter (inches)	Area (ft^2)
6	0.18
8	0.33
10	0.52
12	0.76
14	1.05
16	1.38



V-Style Plates(1)

Plate Diameter (inches)	Area (ft^2)
6	0.16
8	0.29
10	0.46
12	0.67
14	0.92
16	1.20



(1) V-Style plates feature a special cut on the leading edge (or cutting edge). This edge is cut at two successive 45° angles to roughly simulate a spiral. This is in addition to the 45° bevel on the leading edge which is a standard feature for helix plates of both styles. V-Style plates are appropriate for use in applications where rocky or rubble-filled soils are anticipated, or where very dense layers need to be penetrated.

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