FOUNDATION SUPPORTWORKS®

Helicast™ Grouted Helical Pile System

Shaft Material:

1.50” (HA150) or 1.75” (HA175) round corner square bar ASTM A29
Yield strength = 90 ksi
Tensile strength = 115 ksi

Detailed section properties as well as mechanical and torsional limits are available in the FSI Technical Manual

Helix Plates:

ASTM A572 Grade 50 material
⅜” thick (standard)
½” thick (available)
Helix plate geometry conforming to AC358

Surface Finish of Shaft Segments:

Available plain or hot-dip galvanized per ASTM A123

Shaft Coupling Hardware:

(1) - Ø¾” Grade 8 bolt with nut (HA150)
(2) - Ø¾” Grade 8 bolts with nuts (HA175)
Mechanically galvanized per ASTM B695

Soil Displacement Plates:

Ø5.00”, Ø6.00”, and Ø7.00” (HA150)
Ø5.00”, Ø6.00”, Ø7.00”, and Ø9.00” (HA175)
Provided with and without soil displacement paddles
¼” thick ASTM A36 material
Special displacement plates for use with casing are also available
Available plain (standard) or hot-dip galvanized per ASTM A123

Gravity Fed Grout Column:

28 day breaking strength (f'_c) = Varies (4,000 - 6,000 psi is most common)
Modulus of elasticity (E_c) = Varies
Maximum axial compression capacity of grout column at service load[1] = $0.3 \cdot f'_c \cdot A$
Maximum nominal axial compression capacity of grout column[1,3] = $0.6 \cdot f'_c \cdot A$

Maximum Allowable System Compression Capacity[1,3,4,5,6]	= Varies
Maximum Allowable System Tension Capacity[2,4,5,6]	= Varies

(1) Allowable system compression capacity includes the combined effects of friction resistance surrounding the grout column and the soil bearing resistance at the helix plates. Ultimate skin friction resistance should be determined through a generally accepted method of analysis. The available ultimate skin friction should be limited by the nominal axial strength of the grout column. When available skin friction is limited by the grout column strength, then the end bearing resistance at the helix plates should also be neglected from the calculated pile capacity.

(2) Allowable system tension capacity includes only the allowable soil bearing resistance at the helix plates. Skin friction should not be included in the calculated resistance.

(3) FSI recommends the given nominal axial compression capacity of the grout column, which is a simplified version of equation (14.5.3.1) of ACI 318-14 assuming continuous lateral soil confinement. Other generally accepted methods of analysis may be considered at the discretion of the helical pile designer.

(4) The end bearing geotechnical capacity may be estimated during installation by monitoring and recording the final installation torque and applying default torque correlation factors for the central steel shaft per ICC-ES AC358.

(5) The allowable resistance attributed to soil bearing at the helix plates should also not exceed the allowable mechanical capacity of the shaft, couplers, helix plates, or the termination device used at the pile head.

(6) Full scale load testing should be performed on a representative sample for each project. Allowable capacity should be determined by dividing the limiting ultimate load of the load test by an appropriate factor of safety (FOS). Load tests should be conducted in general accordance with the procedures of ASTM D1143 (compression) and D3689 (tension). FOS is most commonly taken as 2.0, although higher or lower factors of safety may be considered at the discretion of the helical pile designer or as dictated by local code or project requirements. Higher factors of safety should be considered when a load test is not performed, including a minimum FOS of 2.5 for the friction resistance.

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