

## MAGNUM GROUTED HELICAL PILES

This technical bulletin addresses the two methods for pressure grouting Magnum® helical piles. The two methods are pressure grouted gravity grouted. Grout specifications will also be discussed in this bulletin.

There are a variety of reasons to grout a helical pile; the main reasons to grout a helical pile are:

- To utilize the frictional resistance between the soil and the grout, to decrease the vertical movement of the pile
- To increase the lateral capacity of the pile
- To increase the buckling capacity of the pile in weak surface soils.

### Pressure Grouting

Magnum® pressure grouted helical piles utilize small grout ports at the tip of the pile and opposite each helix.

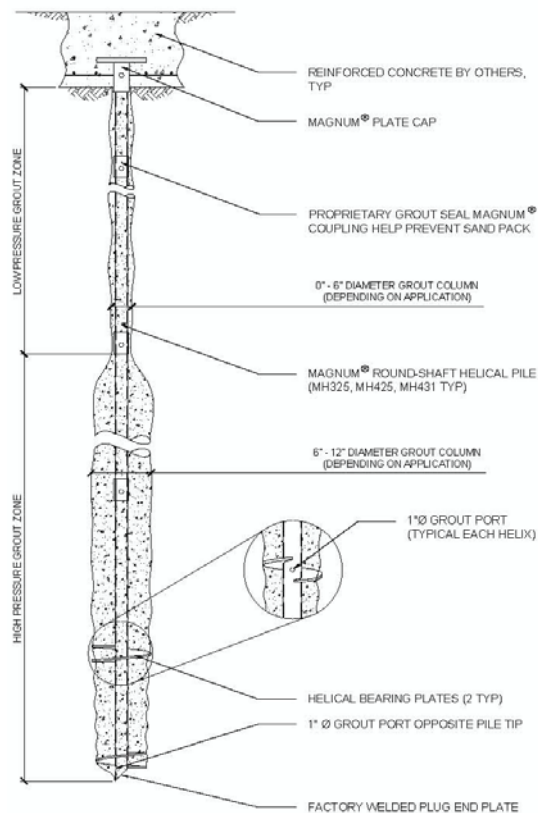


Fig. 1. Magnum® Pressure Grouted Helical Pile.

Pressure grouting allows the installer to control the diameter of the grout column by increasing or decreasing the grout pressure. Measuring the grout-take ensures that the grout column is solid and the diameter needed. This method has been successfully used to create up to 12" diameter grout columns. Pressure grouted piles have no practicable depth limit.

### Gravity Grouting.

Magnum® gravity grouted helical piles utilize Magnum® digger plates. The digger plates are typically installed just below each extension collar (coupler). At the top of each grouted pile is a grout reservoir (not shown here).

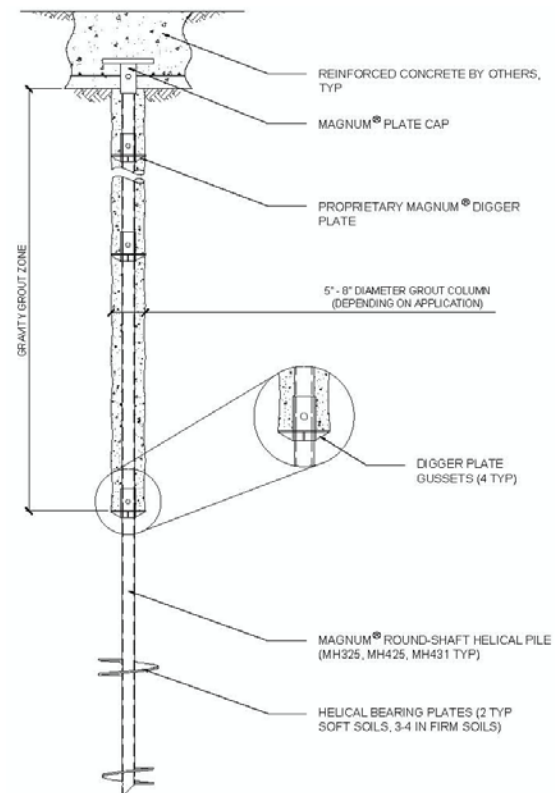


Fig. 2. Magnum® Gravity Grouted Helical Pile.

As the helical pile is advanced, the digger plates create a void space around the shaft, which is filled with grout from the reservoir.



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The diameter of the grout column can be confirmed by measuring the grout-take or the amount of grout that is needed to keep the reservoir full. This method has been successfully used to create 5-inch to 8-inch diameter grout columns. Gravity grouting avoids the use of expensive pumping equipment, needed for pressure grouted piles.

### *Grout*

Grout used for pressure grouting and gravity grouting should be high mobility neat cement grout (type II Portland cement and water) with a maximum water to cement ratio of 0.5 to control shrinkage and ensure adequate strength. The contractor may substitute equal weight of lime for 50% of cement. A retardant additive should be used to allow adequate time for placement.

There are 5 grout types, Type 1 thru Type 5. The following grout types may be used for grouting helical piles, depending on the purpose for grouting.

Type 1 is a cement grout with only a 3-day strength requirement and a fluid consistency that is typically used for filling subsurface voids. This grout has a 3 day compressive strength of 3,000 psi.

Type 2 is a nonshrink grout with strength, height change and flow conforming to ASTM C1107 that is typically used for foundations, ground anchors and soil nails. This grout has a 28 day compressive strength of 5,000 psi.

Type 4 is a neat cement grout with low strength, a fluid consistency and high fly ash content that is typically used for slab jacking. This grout has a 28 day compressive strength of 1,500 psi.

Grout may be mixed using a high shear or colloidal mixers. Grout should be free of any lumps or undispersed cement. Mix grout in accordance with manufacturer's instructions.