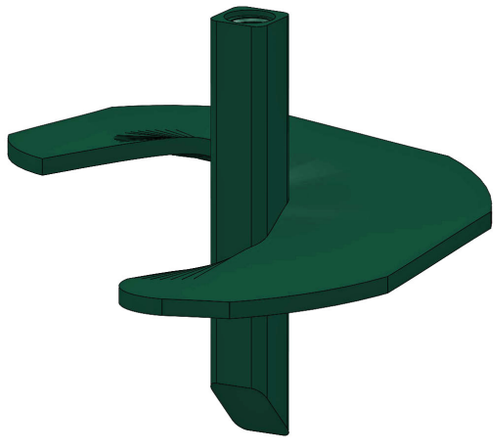
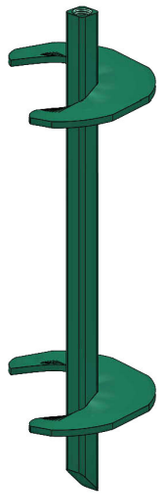
Power Hub Anchors





1-3/8 Inch Square Power Hub Anchors
6,000 ft-lb Ultimate Installing Torque

Catalog Number	Helix Diameter (in)	Tapped for Rod Size (in)	Weight (lbs)
D826	8	5/8	9
D846	8	3/4 or 1	9
D1026	10	5/8	12
D1046	10	3/4 or 1	12
D1126	12	5/8	16
D1146	12	3/4 or 1	16
D1346	14		20
D84-2-6	8, 8		25
D104-2-6	10, 10		30

1-1/2 Inch Square Power Hub Anchors
6,000 ft-lb Ultimate Installing Torque

Catalog Number	Helix Diameter (in)	Tapped for Rod Size (in)	Weight (lbs)
D182	8	5/8	10
D184	8	3/4 or 1	10
D1102	10	5/8	14
D1104	10	3/4 or 1	13
D1114	12		16
D1134	14		21
D284	8, 8		27
D2104	10, 10		32

1-1/2 Inch Square Power Hub Anchors
7,000 ft-lb Ultimate Installing Torque

Catalog Number	Helix Diameter (in)	Tapped for Rod Size (in)	Weight (lbs)
D184-7	8	3/4 or 1	10
D1104-7	10		15
D1114-7	12		17
D244-7	4, 4		20
D284-7	8, 8		27
D2104-7	10, 10		33

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Power Hub Anchor Selection Methodology

A power hub helical tension anchoring system can be described by five basic elements: The rod diameter, the helix diameter, the helix thickness, the hub size, and the eye nut. To select the most cost effective anchoring solution for your project requires the proper sizing of these four elements based on the project load requirements and the type of soil that is expected to be encountered at the anchoring locations.

Rod Selection

MacLean Power Systems (MPS) provides anchor rods in three sizes. The size of the rod will be driven by the expected tension force in the guys that are being anchored. To find the most cost effective rod, the smallest rod size that will satisfy the load requirements should be selected from the following table:

Rod Size Diameter	Ultimate Strength Lbs-force	Threading
5/8" (D62X)	16,000 lbs.	5/8" Thread
3/4" (D75X)	23,000 lbs.	1" Thread
1" (D100X)	36,000 lbs.	

Metric		
Rod Size Diameter	**Ultimate Strength Kg-force**	**Threading**
1.6 cm (D62X)	7,257	1.6 mm
1.9 cm (D75X)	10,432	2.5cm
2.5 cm (D100X)	16,329	

Helix Thickness

MPS anchoring systems are available with 3/8" (1 cm) or 1/2" (1.3 cm) thick helical plates. The selection of helical plate thickness is based on the presence of gravel or cobbles in the soils. In general, the 3/8" (1 cm) thick helical plate is sufficient for most jobs. However, if the site soils contain significant quantities of gravel or cobbles, the anchor will have to push aside the rocky material as it advances. In these cases it is best to use the 1/2" (1.3 cm) thick helix to minimize damage to the anchor during installations.

Helix Diameter

MPS anchoring systems are provided with standard helix diameters of 8" (20.3 cm), 10" (25.4 cm), 12" (30.5 cm) , and 14" (35.6 cm). The appropriate helix selection is also based on the site soils. A smaller helix diameter can be used on denser soils as the smaller helix allows the anchor to better penetrate to the required installation depth. However, a smaller helix also leads to a lower ultimate tension capacity. The choice of helix diameter ultimately comes down to balancing the holding strength of the anchor with the torque capacity of the hub. In general, smaller helix diameters are used in tougher soils and lower holding strengths while larger diameters are used in softer soils and higher holding strengths.

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Power Hub Anchor Selection Methodology

Hub Selection

The selection of the anchor hub will be based on by the soil class. When evaluating the soil type, two items must be considered. First, the anchor must achieve the required torque during installation to meet the project load requirements and secondly, the anchor must be robust enough to be embedded 7 feet. As harder soils are encountered, a more robust hub is needed to resist the higher torques required to achieve the necessary installation depth. The following table can be used to determine the best anchor to use based on the soil conditions:

Product Class	Helix Thickness	Torque Rating	K_t factor[1] (ft^{-1}) in Soil Class Number:								
			8	7	6	5	4	3	2	1	0
1-3/8" Solid Square Hub (DXXX)	3/8"	4,000 ft/lbs	Swamp Soils, Use Power Shaft Anchor	9	9					Too Dense for Helical Anchors, Use Rock Anchor	
1-3/8" Solid Square Hub High Str. (DXXX-6)	3/8"	6,000 ft/lbs		9	9	9					
2-1/4" Socket Drive Anchor (TD225)	3/8"	10,000 ft/lbs		7	7	7	7				
2-1/4" Socket Drive Anchor Heavy Duty (TDH225)	1/2"	10,000 ft/lbs		7	7	7	7				
2-1/2" Socket Drive Anchor (TD250)	3/8"	15,000 ft/lbs		6	6	6	6	6	6		
2-1/2" Socket Drive Anchor Heavy Duty (TDH250)	1/2"	15,000 ft/lbs		6	6	6	6	6	6		

1- The ultimate soil holding strength is equal to the measure installation torque multiplied by the appropriate K_t factor. The lower of this value and the mechanical rating of the selected rod is the ultimate holding strength of the anchor.

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Power Hub Anchor Selection Methodology

Metric										
Product Class	**Helix Thickness**	**Torque Rating**	**K_t factor[1] (ft^{-1}) in Soil Class Number:**							
			8	7	6	5	4	3	2	1	0
3.5 cm Solid Square Hub (DXXX)	1 cm	5,423 Nm	**Swamp Soils, Use Power Shaft Anchor**	9	9					**Too Dense for Helical Anchors, Use Rock Anchor**	
3.5 cm Solid Square Hub High Str. (DXXX-6)	1 cm	8,135 Nm		9	9	9					
5.7 cm Socket Drive Anchor (TD225)	1 cm	13,558 Nm		7	7	7	7				
5.7 cm Socket Drive Anchor Heavy Duty (TDH225)	1.3 cm	20,337 Nm		7	7	7	7				
6.4 cm Socket Drive Anchor (TD250)	1 cm	20,337 Nm		6	6	6	6	6	6		
6.4 cm Socket Drive Anchor Heavy Duty (TDH250)	1.3 cm	20,337 Nm		6	6	6	6	6	6		

1- The ultimate soil holding strength is equal to the measure installation torque multiplied by the appropriate K_t factor. The lower of this value and the mechanical rating of the selected rod is the ultimate holding strength of the anchor.

Eye nut

The selection of eyenut is based on the number of guys that will be attached to the anchor. Single, double, and triple eyenuts are available for all rod sizes and the selection should be based upon whether 1, 2, or 3 guys will be attached to the anchor.

MacLean Real-Time Design

MacLean Real-Time Design (MRD)™ is an online design utility that MPS provides free of charge to all of its customers. MRD™ automatically uses the anchor selection methodology described in this document to select the optimal anchor based upon the project requirements inputted by the user. Please navigate to the following website to begin using MRD™ today:

http://config.macleanpower.com/ext/Login

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Power Hub Anchor Selection Methodology

Example

A 2-guy anchor needs to be installed at a site with Class 4 sandy soils containing significant gravel. The tension on each guy is determined to be 10,000 lbs-force (44.48 kN) ultimate.

1. The ultimate anchor load will be 20,000 lbs (88.96 kN) due to the two 10,000 lb-force (44.48 kN) guys attached. Based on the above table, a 3/4" (1.9 cm)rod will be required to resist this load.
2. Due to the fact that ample gravel is expected in these soils, a 1/2" (1.3 cm) thick helix will be required.
3. A 12” (30.5 cm) helix is chosen as it is in the middle of the helix diameter range and provides a balance between torque requirements and holding strength.
4. From the Hub Selection table, a Class 4 soil, a 2-1/4” (5.7 cm) Turbo Drive® anchor is the most cost effective solution, being the smallest anchor that is suitable for this soil type.
    a. Based on the given K_t factor of 6 and the ultimate required holding strength of 20,000 pounds (88.96 kN), we anticipate that 20,000 lbs. / 6 ft^{-1} = 3,333 ft-lbs (4,519 nm)of torque is needed to achieve the required holding strength.
    b. Note that this means that we may not need to use the entire torsional capacity of the Turbo Drive® we have selected. The reason this larger anchor is recommended, however, is because we need to make sure we get to the 7-foot embedment depth. Due to the dense sandy soils we are expecting at this site, we may need the full 10,000 ft-lbs (13,558 nm) of torque to achieve minimum embedment even though this value exceeds the required minimum torque. Additionally, even if we do get 9,000 ft-lbs (12,202 nm) of torque during installation, the capacity is still limited to the 23,000 lb-force (10.43kN) rating.
5. Since there are 2 guys attaching to this anchor, we select a double eyenut.
6. Consulting the MPS catalog (http://www.macleanpower.com/products/) the appropriate catalog numbers for this configuration are determined:
    a. Anchor: TDH225-114
    b. Rod: D75D

Power Hub Anchor Installation

The typical power hub anchor will be installed with a single 7 ft (2.1 m)length rod. This is generally an adequate embedded depth to meet the expected anchor load capacity.

In some cases additional anchor depth is required. The power hub anchor can be installed by adding another rod of the same size (diameter) either 3-1/2 ft (1.1 m) or 7 ft (2.1 m) length with a coupling. And an additional torque tube extension will be required to accommodate the added rods.

Although the power hub anchor can be installed to a greater depth, it is not recommended to exceed a total depth of 14 ft.(4.3 m)of rod. At greater depth it may be very difficult to extract the tool. And efforts to extract the tool may result in disturbing the soil and compromising the load capacity of the anchor.

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