

# ENCYCLOPEDIA OF ANCHORING



## POWER INSTALLED FOUNDATIONS, GUY ANCHORS AND INSTALLING EQUIPMENT

### SECTION D

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# Tower support method that saves days and dollars

**C**ompared to traditional ways of constructing transmission tower foundations, the Chance power-installed, screw-type foundation system offers attractive benefits in the conservation of labor, materials and equipment. And, most importantly, it saves time.

Chance tower foundations for lattice steel, self-supporting structures usually install at the rate of two to three towers per crew day. Single-element foundations for guyed towers generally install at five or six per crew day, including guy anchor installation.

If your rotary digging equipment provides adequate torque and down pressure, you can install Chance foundations. The only additional elements necessary are Chance Kelly-Bar adapters, torque indicator and drive tool.

Chance foundations and guy anchors are installed in the same manner. You will save on labor costs because smaller work and fewer crafts are involved. Unlike concrete, Chance foundations and anchors can be scheduled throughout the

year. Weather seldom stops construction. There is no waiting for concrete to cure, no excavation and no spoils removal. Towers can be erected immediately, so you save time and eliminate returns to the site.

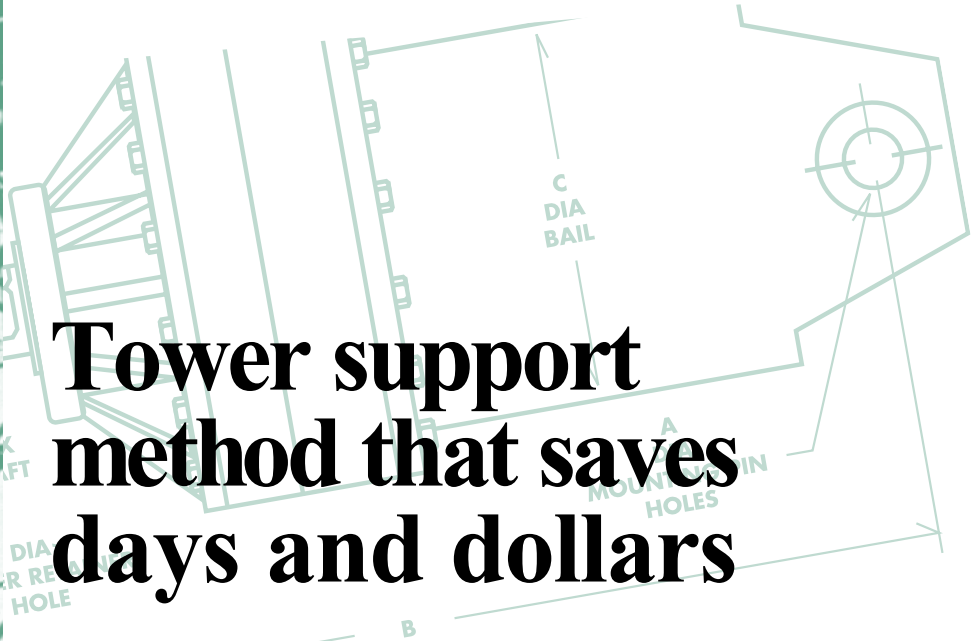


Chance foundations and anchors are ideal in areas inaccessible for conventional construction, or when weather limits construction time. They are valuable for rapidly restoring service in emergencies.

You can install Chance foundations and anchors in almost any type of terrain, including steep inclines, flood plains, glacial till, sand, swamps and bogs. Once the foundations are in place, you

can erect the tower using traditional construction practices. Weather will not delay your construction timetable. You can install Chance foundations in wet and freezing conditions as well as ideal weather.

The design of Chance foundation systems adapt to site conditions. Your crews have many options available, should they encounter unusual or peculiar installation situations.





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uring the past 35 years, Chance expertise and resources have perfected power-installed foundations and guy anchors supporting many utility structures. You know Chance as the World's foremost authority on earth anchoring. Now you can take advantage of Chance as the leading innovator in power-installed foundations for the utility industry.

We encourage you to consult with us about your tower foundation and guy anchor requirements. Partner with Chance resources in the early stages of your project. Chance engineers will analyze your tower loads, soil conditions and construction methods. We'll then recommend the optimum tower foundation and guy anchor system.

Give your Chance representative

the load and soil information for your proposed transmission project so Chance foundation and anchor application engineers can conduct a comprehensive evaluation. Based upon the information provided, we will conduct a study and recommend the system best suited to your needs.

It's a total civil construction package. Our service includes the foundations, the guy anchors and the guy grips...not to mention the experience and expertise to match the various parameters to the most economical system type.

From choice of material to crew training, installing technique and torque requirements, Chance has a comprehensive plan you can count on. Choose Chance foundations and guy anchors for your transmission towers. They're field proven, field respected.

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## Designed for adaptability

**S**implicity of design is one of the greatest advantages of the Chance foundation and anchor systems. The basic foundation and anchor element consists of a multi-helix lead section designed to withstand specific load torque. Extension sections can be added which help permit the lead section to be driven to the necessary depth.

More than 35 years of research, engineering, product development and testing by Chance have brought the art of power-installed foundations and anchors to its mature state. Size and weight are no longer criteria for rating reliability. Advanced design, strength of steel and the science of soil mechanics combine to establish foundation and anchor dependability.

Our foundations are designed to withstand the stress of torsion, bending and shear. High-strength steel helix plates distribute the up-lift and compression forces. The pipe shaft transfers horizontal shear, torsion and bending to surrounding soils. Guy anchors are designed to withstand the tensile loads of guyed towers.

Soil data for your tower sites is entered into our geotechnical anchor data bank. Using proprietary software programs, Chance engineers then job-match each tower foundation and anchor to your specific soil condition to achieve predictable holding strength. You can rely upon Chance foundations and anchors to perform as designed.

Based upon our years of combined experience serving the utility industry, we know how to get the materials you need on-site, on time and ready to use.

## EXTENDIBLE-FOUNDATIONS

### FOR DEEP-BEARING

Chance extendible foundations come in two types. Type HS is a multi-helix lead section of 3-inch extra-heavy pipe shaft (7.6cm) to which additional extensions of the same size diameter may be added if high lateral load-carrying capacity is not required. Type TC is a similar-design lead section with the same type helices used on Type HS foundations plus extensions of 8-inch pipe (20.3cm) for resisting uplift, compression, bending and lateral loads.

### APPLICATIONS

Extendible foundations are especially applicable in areas where a high water table exists. Concrete foundations require soil preparation prior to installation. On jobs with low working clearances, such as when underpinning an existing building, Chance extendible foundations are ideal. Light, temporary structures and prefabricated buildings also have been supported by foundations. Each foundation element may be incorporated into a reinforced-concrete grade beam beneath the structure, or the foundation may attach directly to metal beams which support a structure. In many instances, power-installed foundations can be installed using the same equipment used for drilled foundations.

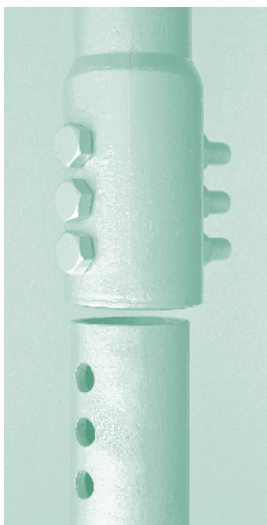
When encountering construction that demands low installing noise levels, vibration control, minimum spoils removal or ground-water concerns associated with excavation, look to removable and re-usable Chance power-installed foundations.



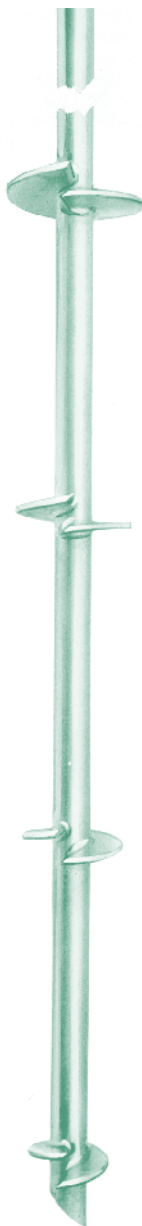
Each high-strength foundation has a galvanized multi-helix lead section of 3-inch extra-heavy pipe (7.6cm) to which extensions of the same size may be added. HS foundations are used in applications where compression and tension loads with moderate lateral leads are encountered. Various lead configurations and extensions allow flexibility in event of unexpected sub-surface conditions.

**CONNECTION**

Type HS lead sections and extensions connect by bolted couplings. Two types of termination are available. One adapter accepts a threaded stud or L-Stud assembly for tension load. The adapter is embedded in a concrete cap. The other termination will accept a shackle or Chance ADJUST-A-GRIP® deadend for guy strands. Other special connectors can be fabricated on request.



**HS Extension**



**Type HS Foundation**



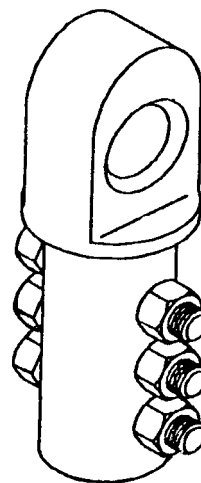
**HS FOUNDATION TOOL**

Tubular tool fits over end of 3-inch pipe (7.6cm pipe) Type HS foundation for power installation. A throughbolt secures the tool to the foundation for driving.

Catalog No.	Weight, lb.	Weight, kg
C303-0754	15	7

**HS-Lead Sections**

Cat. No.	Length, ft.	Length, m	Helix Config., in.	Helix Config., cm
C107-0561	4½	1.4	10, 12	25.4, 30.5
C107-0562	4½	1.4	12, 14	30.5, 35.6
C107-0564	7	2.1	10, 12, 14	25.4, 30.5, 35.6
C107-0565	6½	2.0	12, 14, 14	30.5, 35.6, 35.6
C107-0566	10½	3.2	8, 10, 12, 14	20.3, 25.4, 30.5, 35.6
C107-0567	10½	3.2	10, 12, 14, 14	25.4, 30.5, 35.6, 35.6
C107-0568	10½	3.2	12, 14, 14, 14	30.5, 35.6, 35.6, 35.6



**Guy Termination Adapter**  
Catalog No. C111-0046

**HS-Extensions**

Cat. No.	Length, ft.	Length, m	Helix Config., in.	Helix Config., cm
C107-0577	4	1.2	14	35.6
C107-0579	7	2.1	14, 14	35.6, 35.6
C107-0573	3½	1.1	None	None
C107-0574	5	1.5	None	None
C107-0575	7	2.1	None	None

**11,000 ft.-lb. (15,000Nm) Torque Capacity**

See page D8 for foundation grillages and connections.



## TYPE-TC-FOUNDATIONS

Tension/Compression Foundations have galvanized lead sections and extensions of 8-inch pipe (20.3cm) for resisting up-lift, compression and lateral loads. See page 9 for standardized components that provide flexibility in joining foundation to superstructure. A conventional pile cap will work with TC Foundations.

### CONNECTION

Type TC members connect by bolted couplers at the top of the multi-helix lead section and each end of the extension section. For single-element foundations, two terminations are available. Bolted-Cap (to accept a shoe base or similar means to fit the superstructure) and Stub Angle (grouted into the extension cavity). For multi-element foundations, connections to transfer structural loads from the superstructure include the conventional concrete pile cap and metal grillages (Chance Tripod and Quadropod designs for compression loads which can be field welded or bolted to also transfer tension loads).

Installation tolerances are incorporated into the Bolted Cap and Metal Grillage designs. The Bolted Cap provides a  $\pm 1.4$  inches (3.5cm) of horizontal adjustment. In general, grillages permit  $\pm 2^\circ$  from a  $10^\circ$  batter on each element. Grouted or concrete connections provide considerable flexibility in setting the Stub Angle or conventional anchor bolts in the pipe cavity.



### TC FOUNDATION TOOL

This special tool has drive pins that insert into the bolt holes of the couplers on TC foundation anchor lead sections and extensions. Easy-release mechanisms permit quick changes for additional extensions.

Catalog No.	Weight, lb.	Weight, kg
C303-0594	38	17

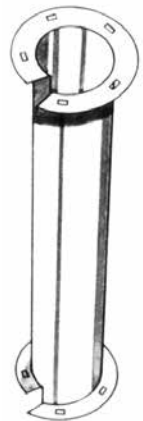
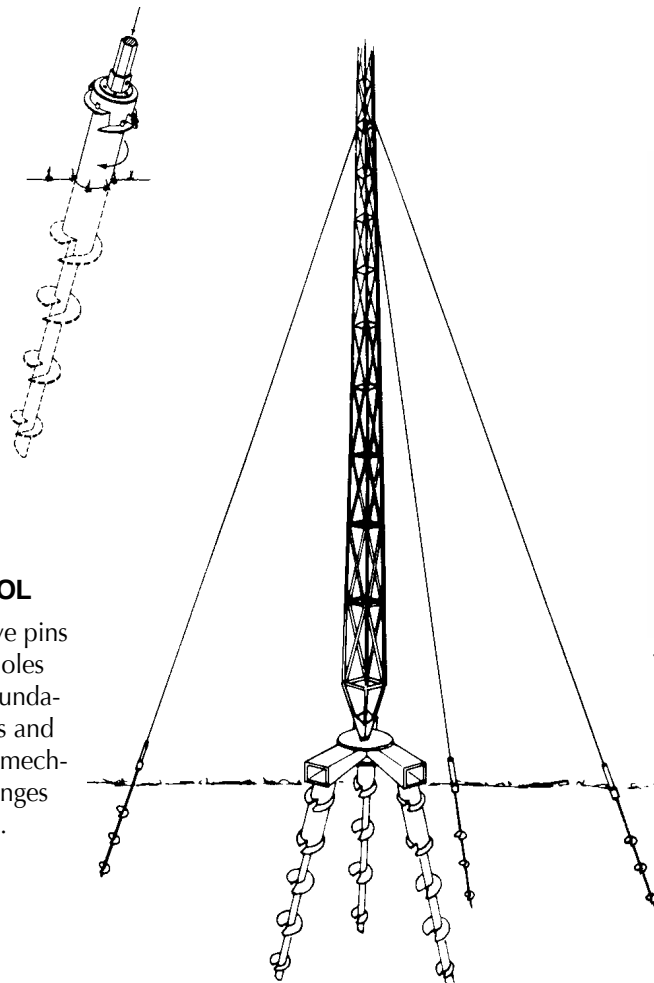
### TC-Lead Sections (3-inch/7.6cm)

Cat. No.	Length, ft.	Length, m	Helix Config., in.	Helix Config., cm
C107-0666	5	1.5	10, 14	25.4, 35.6
C107-0667	7	2.1	8, 10, 14	20.3, 25.4, 35.6
C107-0668	7	2.1	10, 12, 14	25.4, 30.5, 35.6
C107-0669	10	3.0	8, 10, 12, 14	20.3, 25.4, 30.5, 35.6
C107-0670	10	3.0	10, 12, 14, 14	25.4, 30.5, 35.6, 35.6

11,000 ft.-lb. (15,000Nm) Torque Capacity

### TC-Extension Sections (8-inch/20.3cm)

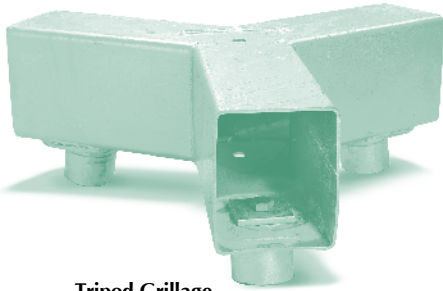
Cat. No.	Length, ft.	Length, m	Helix Config., in.	Helix Config., cm
C107-0656	3	0.9	14, 14	35.6, 35.6
C107-0657	5	1.5	14, 14	35.6, 35.6
C107-0658	7	2.1	14, 14	35.6, 35.6
C107-0659	10	3.0	14, 14	35.6, 35.6



TC Foundation

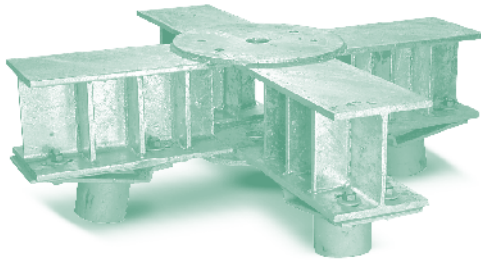
See page D8 for foundation grillages and connections.

**Tripod Grillages**



**Tripod Grillage**

Catalog No.	Description	Max. Compressive Load	
		KIPS	kg
C107-000203	Tripod to fit on 3" Pipe (7.6cm)	125	56,700
C107-001903	Tripod to fit on 3" Pipe (7.6cm)	150	68,000
C107-019203	Tripod to fit on 3" Pipe (7.6cm)	200	90,700
T107-027803	Tripod to fit on 3" Pipe (7.6cm)	250	113,400
C107-000208	Tripod with (3) 8" Pipe Adapters (20.3cm)	125	56,700
C107-001908	Tripod with (3) 8" Pipe Adapters (20.3cm)	150	68,000
C107-019208	Tripod with (3) 8" Pipe Adapters (20.3cm)	200	90,700
C107-027808	Tripod with (3) 8" Pipe Adapters (20.3cm)	250	113,400

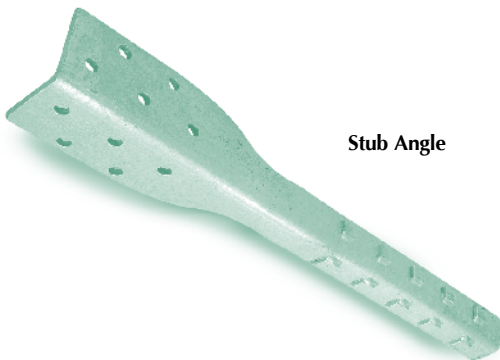


**Quadrupod Grillage**

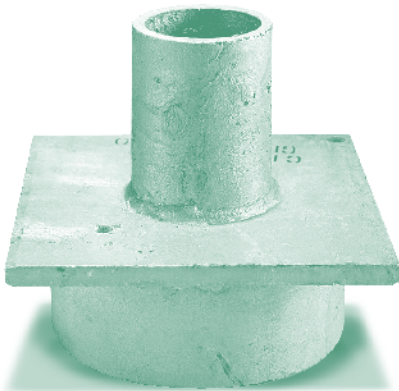
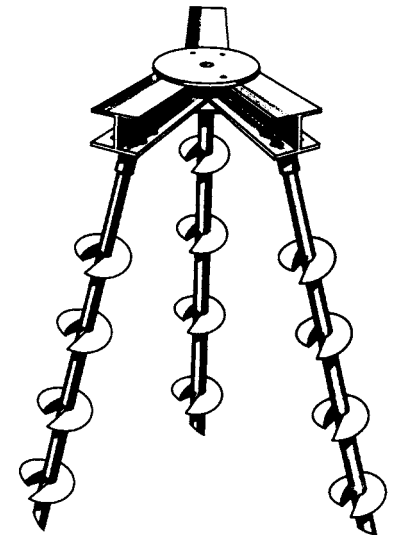
**Quadrupod Grillages**

Catalog No.	Description	Max. Compressive Load	
		KIPS	kg
T107-030303	Quadrupod to fit on 3" Pipe (7.6cm)	350	158,800

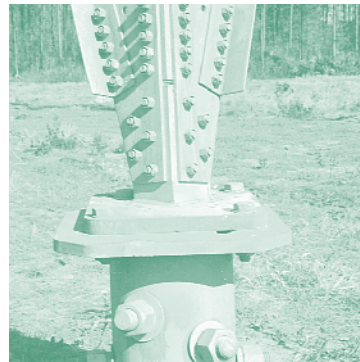
*Note: Grillages available on a made-to-order basis.*



**Stub Angle**



C107-0004 Adapter for 8" Pipe (20.3cm)





## INSTALLING EQUIPMENT

### GENERAL CONSIDERATIONS

To select appropriate anchor-installing equipment, first consider two basic requirements: Sufficient torque capacity and sufficient ground clearance at output shaft. Other criteria that deserve advance attention include: Material-handling capability, site limitations to overhead clearance, mobility (consider self-propelled vs. carrier-mounted and tracked vs. wheeled vs. floating).

For the requirements on a specific job, also consider the characteristics of two basic types of foundation-installing machinery. Guided-head installers offer excellent control over foundation posi-

tioning and alignment: suppliers include Acker, Highway, Hughes, ICE, Sterling, Texoma and Williams. Articulated-head installers usually suspend the torque head on a boom which also can be used to handle materials at the job site: suppliers include Altec, Caterpillar, Deere, Telelect and Wajax.



## ANCHOR/FOUNDATION TORQUE HEAD



- **HYDRAULIC, VEHICLE-MOUNTED**
  - **6,000 FT.-LB. (8,100Nm)**
  - **12,000 FT.-LB. (16,000Nm)**
- TORQUE RATINGS**

Specially suited for installing all screw-type anchors and foundations by such hydraulic equipment as backhoes, the torque head comes in three torque-rating ranges. The design also delivers other features for rugged field conditions:

- Precision planetary gears and bearings in oil-filled, sealed gearcase;
- Heavy-duty output housing and bearings;
- Backhoe bracket with dual-pin mounting provides drive-head positioning for controlled installations;
- Heavy-duty bail flange mounted to gearcase housing provides balanced load-sharing torque restraint;
- Torque head also readily accepts earth augers for hole digging.

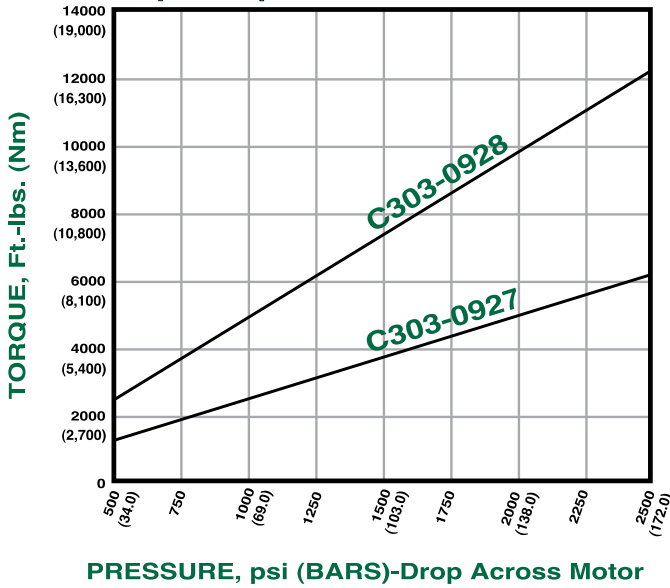
Hose assemblies are not furnished with torque heads. For hydraulic flow more than 20 gpm (76 liters/min.),  $\frac{3}{4}$ " diameter hose (1.9cm hose) is recommended. For flow rates of 20 gpm (76

liters/min.) and below,  $\frac{1}{2}$ " hose (1.3cm hose) may be used. Swivel joint and swivel joint adapter are furnished. Thread size is 1"-11 $\frac{1}{2}$ " NPSM (National Pipe Straight Mechanical).

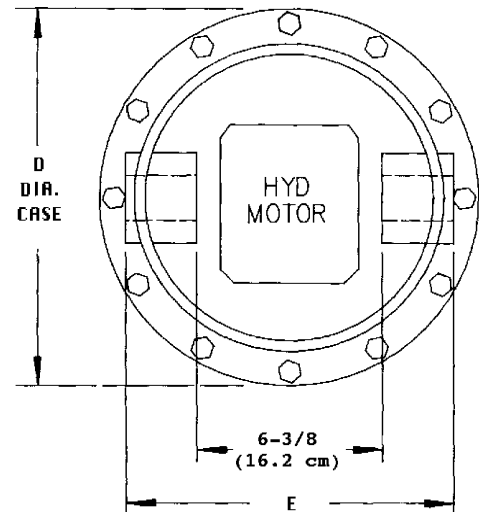
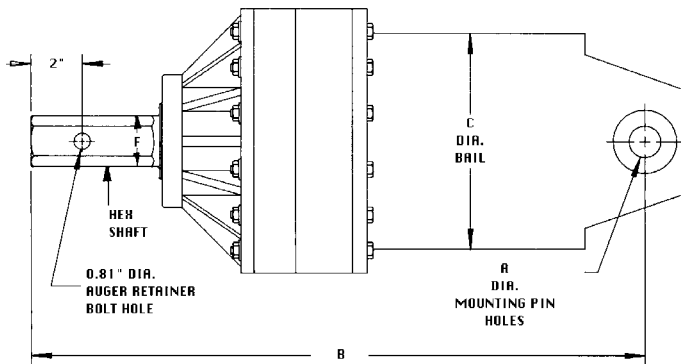
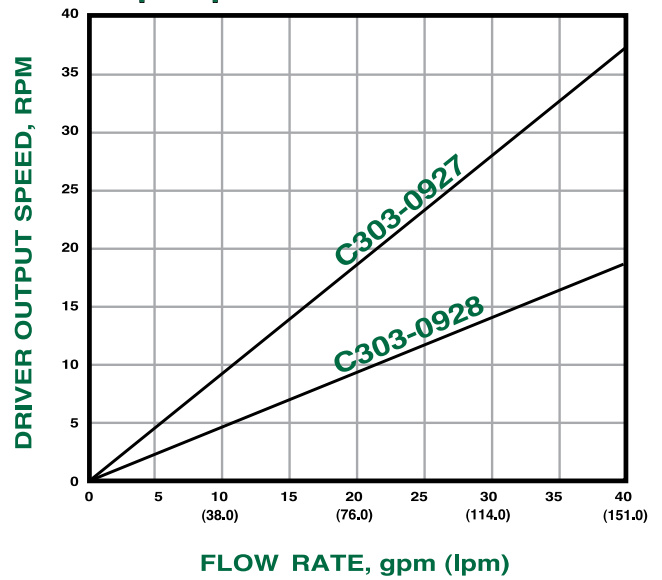


# ANCHOR/FOUNDATION TORQUE HEAD, CONTINUED

### Output Torque vs. Pressure



### Output Speed vs. Flow



### Anchor/Foundation Torque Heads

Catalog Number	Running Torque ft.-lb.	Running Torque Nm	Flow gpm	Speed rpm	Wt. lb.	Wt. kg	Dimensions (in., cm)											
							A	B	C	D	E	F						
C3030927	6,000 @ 2,400 psi	8,100 @ 165 BARS	40	39	246	112	1.5	3.81	29.5	74.9	10.7	27.2	13	33.0	11.4	28.9	2.5	6.4
C3030928	11,500 @ 2,400 psi	15,600 @ 165 BARS	40	20	246	112	1.5	3.81	29.5	74.9	10.7	27.2	13	33.0	11.4	28.9	2.5	6.4

### \*Mounting Brackets

Dimensions, inches		Backhoe Brand Name	Catalog Number	Bracket Description
*A	B			
10.1	1.5	Case	C3030969	6K & 11.5K ft.-lb. Eskridge
10.1	1.0	Case	C3030970	3.5K ft.-lb. Eskridge
7.00	1.5	JCB	C3030971	6K & 11.5K ft.-lb. Eskridge
7.00	1.0	JCB	C3030972	3.5K ft.-lb. Eskridge
8.18	1.5	John Deere	C3030973	6K & 11.5K ft.-lb. Eskridge
8.18	1.0	John Deere	C3030974	3.5K ft.-lb. Eskridge

\*Bracket accepts boom up to 10.2" wide (1.75" dia. pin). For booms 7" & 8.18" wide, 2 spacer bushings supplied. Other bushings available for backhoes not listed.

