

# Manual & Hydraulic Clutch Products



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AUTORIZADO

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# TB Wood's

TB Wood's is an industry leading designer and manufacturer of mechanical power transmission equipment for industrial control. Our mechanical product lines include: clutch and brake, synchronous and belted variable speed drives; grid, disc, jaw, gear coupling and elastomeric coupling products; sheaves and bushings. Registered trademarks include Sure-Flex Plus®, Dura-Flex®, G-Flex®, and Sure-Grip®.

TB Wood's was founded in 1857 and began as a foundry producing wood burning stoves. Our company's tradition of product innovation started early. TB Wood's entered the power transmission industry at the turn of the century with the introduction of flat belted drives and line shafting.

VISIT US ON THE WEB AT  
**TBWOODS.COM**

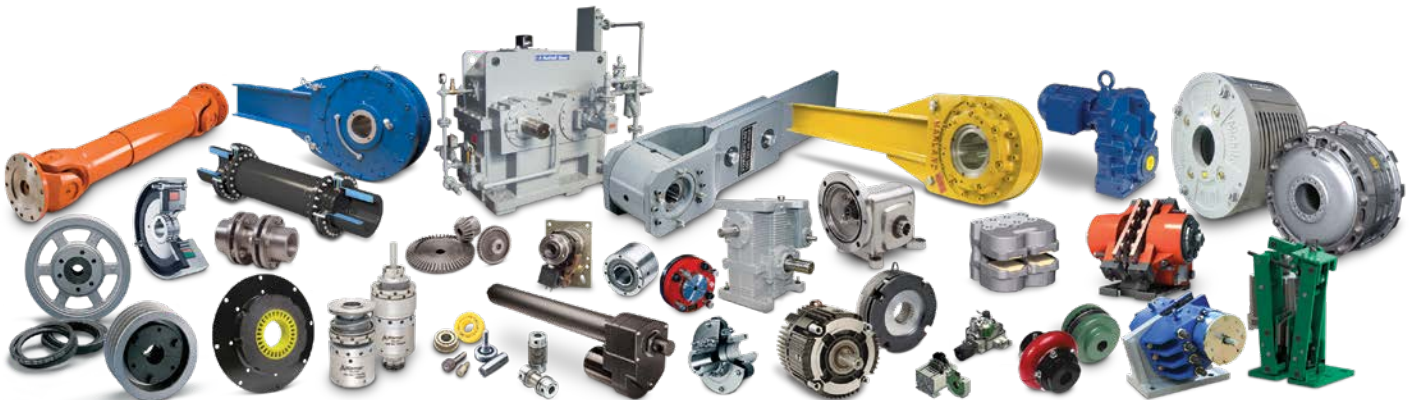


# Altra Industrial Motion

Altra is a leading global designer and manufacturer of quality power transmission and motion control products utilized on a wide variety of industrial drivetrain applications. Altra clutches and brakes, couplings, gearing and PT component product lines are marketed under the industries most well known manufacturing brands. Each brand is committed to the guiding principles of operational excellence, continuous improvement and customer satisfaction. Highly-engineered Altra solutions are sold in over 70 countries and utilized in a variety of major industrial markets, including food processing, material handling, packaging machinery, mining, energy, automotive, primary metals, turf and garden and many others.

Altra's leading brands include **Ameridrives**, **Bauer** Gear Motor, **Bibby** Turboflex, **Boston** Gear, **Delroyd** Worm Gear, **Formsprag** Clutch, **Guardian** Couplings, **Huco**, **Industrial** Clutch, **Inertia** Dynamics, **Kilian**, **Lamiflex** Couplings, **Marland** Clutch, **Matrix**, **Nuttall** Gear, **Stieber** Clutch, **Stromag**, **Svendborg** Brakes, **TB Wood's**, **Twiflex**, **Warner** Electric, **Warner** Linear and **Wichita** Clutch.

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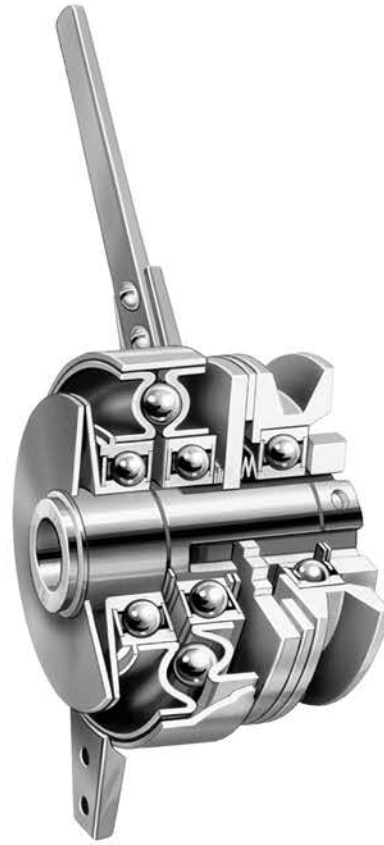


DISTRIBUIDOR AUTORIZADO MEX (55) 53 63 23 31 MTY (81) 83 54 10 18  
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## Section G1

### **Roto-Cam<sup>®</sup> — Mechanical Clutch**

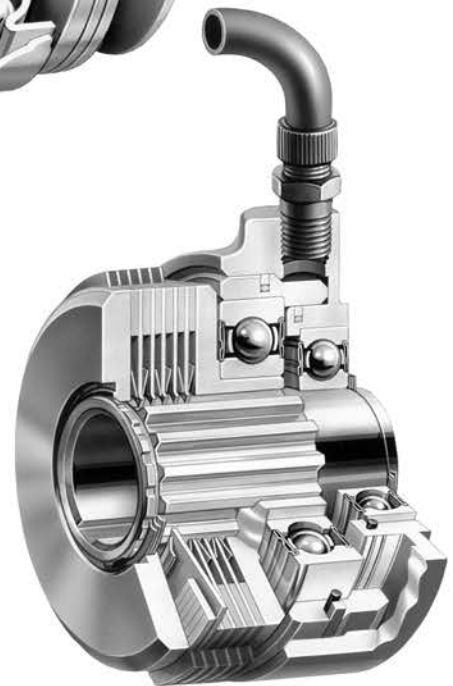
- Simple Design
- Smooth Cam Actuated Engagement
- Sealed for Dirty or Dusty Applications
- No Lubrication



## Section G2

### **Disc-O-Torque<sup>®</sup> — Hydraulic Clutch**

- Minimum Size / Maximum Torque
- Lubricated and Sealed Bearing Types
- Air or Oil Activation
- Long Life





# ROTO-CAM® Manual Clutch

## SECTION G1

### Features of Roto-Cam

Manually Controlled Cam Operated Clutch

Available in four different types, one to suit your need.

Cutaway illustration—Model C1  
(CA—Type 1) . . . with integral, ball bearing  
mounted sheave and direct hand-lever  
control. U.S. Patent No. 3,127,969.

The cam-supported ball bearings incorporated in Roto-Cam Clutches are precision, deep-groove, pre-lubricated, sealed, Conrad-Type, class ABEC-1—with high thrust load capacities . . . no maintenance. The entire load—and only load—on these bearings is the Belleville spring force . . . a constant, controlled, conservative loading . . . assures highly reliable B-10 bearing life values for thousands of hours of operation.

Heavy-duty, steel pressure plate is faced with a bonded-on, molded friction lining.

Locking collar provides fully exposed, easily accessible setscrews for locking clutch to shaft and key—without need to disassemble clutch.

Heavy duty, precision Belleville springs provide the axial force that determines clutch torque capacity—and provide automatic take-up for wear.

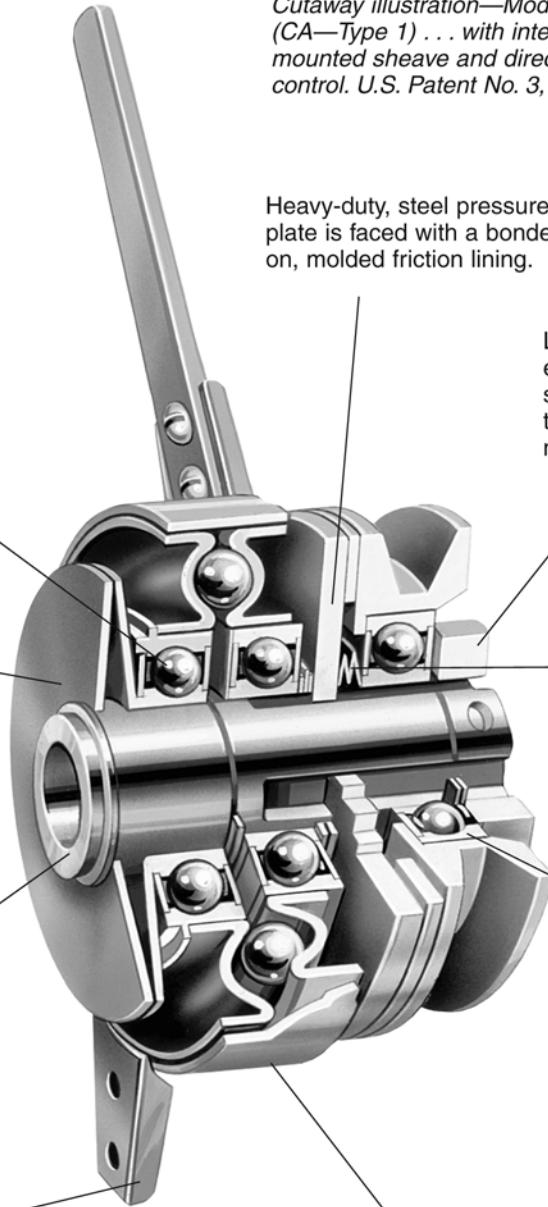
High-quality, Belleville separator springs provide fast, positive release between friction members . . . provide an absolute minimum of idling, or neutral drag.

Clutch hub is precision-ground, available in various standard bore sizes to fit most gas engine and electric motor shaft sizes. Other bore sizes available on request.

“V” belt sheave is mounted on a heavy-duty, precision, deep-groove, pre-lubricated, sealed, class ABEC-1 ball bearing . . . permits continuous idling—eliminates heat, wear and idling drag.

Actuating tabs are a permanent part of the steel cams—providing attachment points for a wide variety of actuating means . . . local manual (as shown)—or with push-pull rods or cables for remote manual or powered actuation . . . completely eliminating separately mounted fulcrums, pivot-points, yokes, trunnions, or loose, rattling levers and links.

The steel cams are encircled by a close-fitting, flat garter-type, neoprene seal ring—affixed to the rear cam, but permitting the front cam to slide within the seal ring during actuation . . . positively protecting the cam-and-ball mechanism against entry of dirt, water, or any foreign material . . . permits true “Rolling-Action.”









## Easy Step by Step Selection Method

### Step # 1: Calculate Load Torque.

$$\text{Load Torque (ft. lbs)} = \frac{\text{HP} \times 5250}{\text{RPM}}$$

### Step # 2: Select service factor based on prime mover and driven equipment.

| DRIVEN EQUIPMENT LOAD CLASSIFICATIONS                              |  |  |   |  |
|--|--|--|---|--|
|  | LIGHT STEADY LOADS<br>Starting torque is equal to or slightly greater than running torque.   | MODERATE LOADS<br>High starting torque or above average running torque.  | MEDIUM LOADS<br>Starting torque is approximately double running torque.   | HEAVY-DUTY LOADS<br>High starting torque, shock loading, light torque reversals during drive.  |
|  |   |   |    |   |
|  | Centrifugal pumps, uniformly loaded conveyors, light-duty fans and blowers, liquid mixers and agitators, centrifugal compressors and vane type blowers, gear pumps, textile machinery, wood-working machinery. | Machine tools, hot oil pumps, heavy-duty centrifugal pumps cooling towers, slurry agitators, boiler feed pumps, hoists, conveyors. | Dredge pumps, dynamometer drives, light-duty hammermills, lineshafts, paper-converting machinery rotary kilns, rotary or screw-type pumps for high viscosity fluids, paper mill cranes. | Mine ventilating fans, reciprocating pumps or compressors, paper making machinery, heavy-duty hammer-mills, ore crushers, pulverizing mills. |
| PRIME MOVER  |  |  |   |  |
| Steam, gas or air turbine  | 1.00   | 1.25   | 1.50  | 2.50   |
| AC electric motor  | 1.25   | 1.50   | 1.50  | 2.50   |
| DC electric motor or DOL start AC electric motor, hydraulic motors | 1.25   | 1.50   | 1.75  | 3.00   |
| Gasoline, natural gas, propane or other spark ignition engine      | 1.75*  | 1.75*  | 2.50*   | CONSULT ENGINEERING  |
| Diesel   | CONSULT ENGINEERING  |  |   |  |

\* If a type 4 clutch is selected, a hardened drive cup is recommended.

### Step # 3: Calculate Design Torque.

$$\text{Design Torque} = \text{Load Torque} \times \text{Service Factor}$$

# ROTO-CAM® Selection Procedure (continued)

## Step # 4: Determine the most suitable type of clutch.

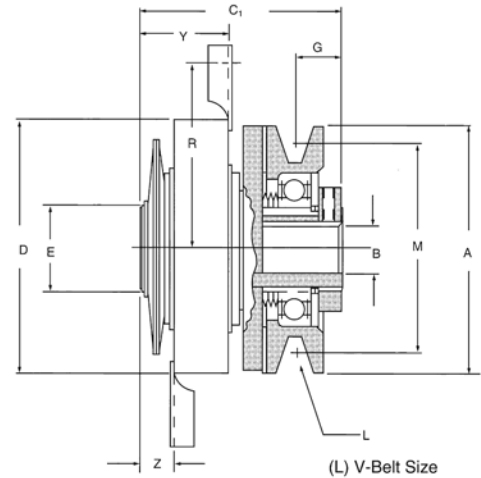
(see page G2—4 for dimensions)

### Type C1

Single-plate with integral bearing-mounted sheave.

#### Mounting considerations:

Align closely so sheave is not forced against friction plates when disengaged.

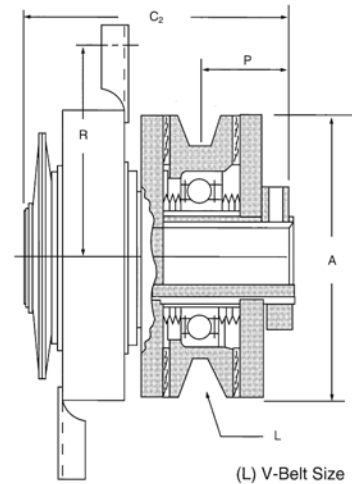


### Type C2

Dual-plate with integral bearing-mounted sheave.

#### Mounting considerations:

Align closely so sheave is not forced against friction plates when disengaged.



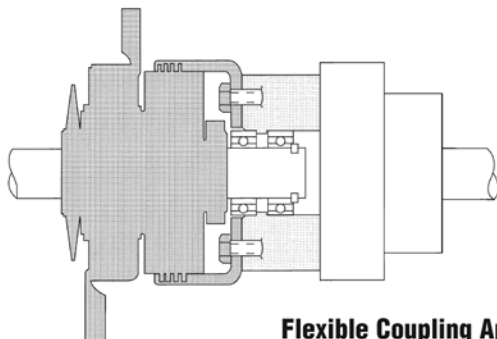
### Type C4 (DRY)\*

Multiple disc — lugged for use with drive cup.

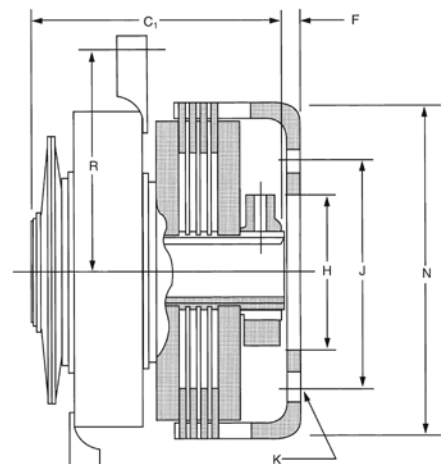
\*Wet units are available upon request  
— contact TB Wood's Application Engineering.

#### Mounting considerations:

The cup and the clutch are to be aligned within .005". When used with a flexible coupling: one half of the coupling should be fastened to the cup and bearing mounted on the clutch shaft as shown. This is done to keep coupling and clutch concentric.



Flexible Coupling Application



(K) Number and Size  
Drive Cup Mounting Holes

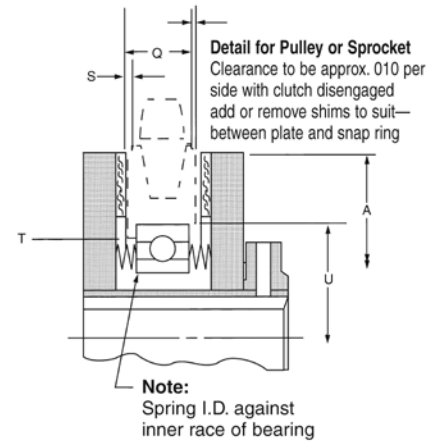
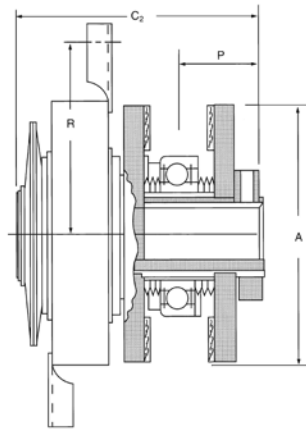
# ROTO-CAM® Selection Procedure (continued)

## Type C5

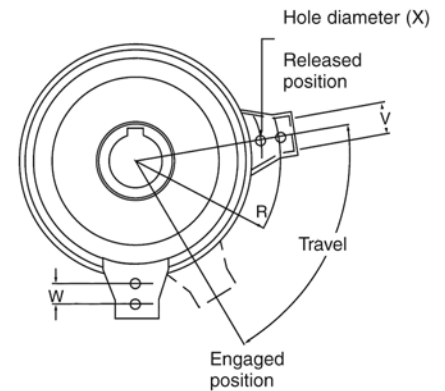
**Dual-plate — customer to supply sheave or sprocket**

**Mounting considerations:**

Align closely so sheave or sprocket is not forced against friction plates when disengaged. Customer supplied pulley or sprocket should be square to the bore within .003" and have a surface finish of 30–60 RMS.



| Dimension               | Size        |                  |                  |                  |
|-------------------------|-------------|------------------|------------------|------------------|
|                         | 30          | 40               | 45               | 55               |
| A Diameter              | 3.00        | 4.00             | 4.50             | 5.50             |
| B1 Rough Bore           | 0.38        | 0.50             | 0.62             | 0.75             |
| B2 Maximum Bore         | 0.687       | 1.000            | 1.187            | 1.500            |
| C1 Hub Length           | 2.62        | 3.25             | 3.62             | 3.89             |
| C2 Hub Length           | 3.09        | 3.81             | 4.18             | 4.42             |
| D Cam Diameter          | 3.25        | 4.25             | 4.93             | 5.59             |
| E Hub Diameter          | 1.00        | 1.38             | 1.56             | 1.98             |
| F Drive Cup Location    | 0.18        | 0.25             | 0.25             | 0.38             |
| G Pulley Location       | 0.56        | 0.75             | 0.75             | 0.75             |
| H Drive Cup I.D.        | 1.377/1.375 | 1.877/1.875      | 2.002/2.000      | 2.504/2.500      |
| J Bolt Circle           | 2.12        | 3.00             | 3.25             | 3.75             |
| K Hole Qty/Diameter     | 4/.27       | 6/.33            | 6/.33            | 6/.33            |
| L Sheave Groove         | A           | AB               | AB               | AB               |
| M Datum Diameter        | 2.75-A      | 3.25-A<br>3.65-B | 3.75-A<br>4.15-B | 4.75-A<br>5.15-B |
| N Drive Cup O.D.        | 3.31        | 4.38             | 4.87             | 6.00             |
| P Sheave Location       | 1.00        | 1.31             | 1.31             | 1.31             |
| Q Sheave/Sprocket Width | 0.69        | 0.87             | 0.87             | 0.87             |
| R Hole Radius           | 2.41        | 2.93             | 3.25             | 3.69             |
| S Bearing Location      | .110/.100   | .167/.157        | .145/.135        | .130/.120        |
| T Diameter              | 1.69        | 2.22             | 2.47             | 2.91             |
| U Sheave/Sprocket I.D.  | 1.849/1.850 | 2.439/2.441      | 2.675/2.677      | 3.148/3.150      |
| V Cam Slot Width        | 0.62        | 0.75             | 0.75             | 0.88             |
| W Hole Location         | 0.50        | 0.50             | 0.50             | 0.62             |
| X Hole Diameter         | 0.203       | 0.266            | 0.266            | 0.266            |
| Y Cam Location          | 1.25        | 1.50             | 1.78             | 1.93             |
| Z Cam Location          | 0.47        | 0.69             | 0.69             | 0.69             |



*Anchor stationary tab with strap, rod, or pin. This stationary tab must be able to move axially to allow cam operation.*

**Step # 5: Select clutch size using design torque (step # 3) and clutch type (step # 4).**

| Clutch Size | Torque Capacity (ft.lbs.) |    |          |           |    | Engagement Control |                   | Maximum RPM for Engagement |        |
|-------------|---------------------------|----|----------|-----------|----|--------------------|-------------------|----------------------------|--------|
|             | TYPE                      |    |          |           |    | Lbs. @ R           | Degrees of Travel | Type 1, 2, & 5             |        |
|             | C1                        | C2 | C4 (DRY) | C4 (WET*) | C5 |                    |                   | Type 1, 2, & 5             | Type 4 |
| 30          | 7.5                       | 15 | 35       | 25        | 15 | 15                 | 82                | 6350                       | 5050   |
| 40          | 17                        | 35 | 75       | 60        | 35 | 25                 | 70                | 4750                       | 3800   |
| 45          | 25                        | 50 | 110      | 90        | 50 | 35                 | 70                | 4200                       | 3350   |
| 55          | 45                        | 90 | 180      | 150       | 90 | 45                 | 70                | 3450                       | 2750   |



# ROTO-CAM® Selection Procedure (continued)

**Step # 6: Order clutch by the correct product number.**

**Example:**



**Type 1**

| Clutch Description | Product Number | Wt. (Lbs.) |
|--------------------|----------------|------------|
| C130 x 3/8 RB      | C130RB         | 3.0        |
| C130 x 5/8         | C13058         | 3.0        |
| C140 x 1/2 RB      | C140RB         | 6.0        |
| C140 x 3/4         | C14034         | 6.0        |
| C140 x 7/8         | C14078         | 6.0        |
| C140 x 1           | C1401          | 6.0        |
| C145 x 5/8 RB      | C145RB         | 9.0        |
| C145 x 1           | C1451          | 9.0        |
| C145 x 1-1/8       | C145118        | 9.0        |
| C155 x 3/4 RB      | C155RB         | 12.0       |
| C155 x 1           | C1551          | 12.0       |
| C155 x 1-1/8       | C155118        | 12.0       |
| C155 x 1-1/4       | C155114        | 12.0       |
| C155 x 1-7/16      | C1551716       | 12.0       |

**Type 2**

| Clutch Description | Product Number | Wt. (Lbs.) |
|--------------------|----------------|------------|
| C230 x 3/8 RB      | C230RB         | 4.0        |
| C230 x 5/8         | C23058         | 4.0        |
| C240 x 1/2 RB      | C240RB         | 7.0        |
| C240 x 3/4         | C24034         | 7.0        |
| C240 x 7/8         | C24078         | 7.0        |
| C240 x 1           | C2401          | 7.0        |
| C245 x 5/8 RB      | C245RB         | 10.0       |
| C245 x 7/8         | C24578         | 10.0       |
| C245 x 1           | C2451          | 10.0       |
| C245 x 1-1/8       | C245118        | 10.0       |
| C255 x 3/4 RB      | C255RB         | 14.0       |
| C255 x 1           | C2551          | 14.0       |
| C255 x 1-1/8       | C255118        | 14.0       |
| C255 x 1-1/4       | C255114        | 14.0       |
| C255 x 1-7/16      | C2551716       | 14.0       |

**Type 4**

| Clutch Description | Product Number | Wt. (Lbs.) |
|--------------------|----------------|------------|
| C430 x 3/8 RB      | C430RB         | 4.0        |
| C430 x 5/8         | C43058         | 4.0        |
| C440 x 1/2 RB      | C440RB         | 8.0        |
| C440 x 3/4         | C44034         | 8.0        |
| C440 x 7/8         | C44078         | 8.0        |
| C440 x 1           | C4401          | 8.0        |
| C445 x 5/8 RB      | C445RB         | 11.0       |
| C445 x 1           | C4451          | 11.0       |
| C445 x 1-1/8       | C445118        | 11.0       |
| C455 x 3/4 RB      | C455RB         | 15.0       |
| C455 x 1           | C4551          | 15.0       |
| C455 x 1-1/8       | C455118        | 15.0       |
| C455 x 1-1/4       | C455114        | 15.0       |
| C455 x 1-7/16      | C4551716       | 15.0       |

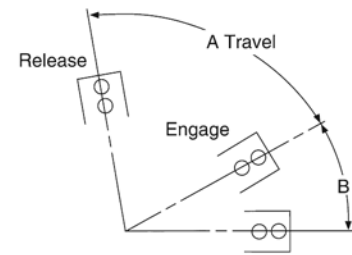
**Type 5**

| Clutch Description | Product Number | Wt. (Lbs.) |
|--------------------|----------------|------------|
| C530 x 3/8 RB      | C530RB         | 3.0        |
| C530 x 5/8         | C53058         | 3.0        |
| C540 x 1/2 RB      | C540RB         | 6.0        |
| C540 x 3/4         | C54034         | 6.0        |
| C540 x 7/8         | C54078         | 6.0        |
| C540 x 1           | C5401          | 6.0        |
| C545 x 5/8 RB      | C545RB         | 9.0        |
| C545 x 1           | C5451          | 9.0        |
| C545 x 1-1/8       | C545118        | 9.0        |
| C555 x 3/4 RB      | C555RB         | 15.0       |
| C555 x 1           | C5551          | 15.0       |
| C555 x 1-1/8       | C555118        | 15.0       |
| C555 x 1-1/4       | C555114        | 15.0       |
| C555 x 1-7/16      | C5551716       | 15.0       |

Roto-Cam clutches are supplied with cam tabs in the standard position unless otherwise specified at the time of order. Standard and alternative cam tab positions are shown on this page.

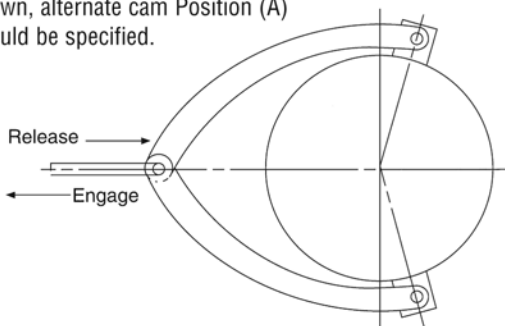
| Clutch Size | Cam Location in Degrees |    |     |    |
|-------------|-------------------------|----|-----|----|
|             | A                       | B  | C   | D  |
| 30          | 82                      | 30 | 150 | 8  |
| 40          | 70                      | 30 | 150 | 20 |
| 45          | 70                      | 35 | 155 | 15 |
| 55          | 70                      | 30 | 150 | 20 |

**Standard Position**

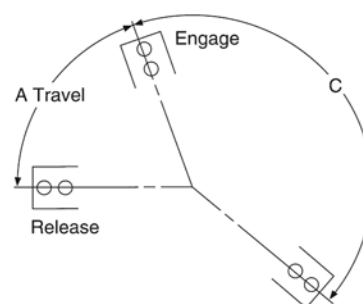


**Double Yoke**

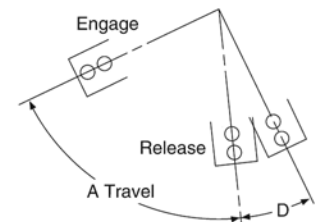
For double or yoke mounting, as shown, alternate cam Position (A) should be specified.



**Alternate Position (A)**



**Alternate Position (B)**



| Clutch | Rebuild Kit |
|--------|-------------|
| C130   | C130K       |
| C140   | C140K       |
| C145   | C145K       |
| C155   | C155K       |
| C230   | C230K       |
| C240   | C240K       |
| C245   | C245K       |
| C255   | C255K       |
| C430   | C430K       |
| C440   | C440K       |
| C445   | C445K       |
| C455   | C455K       |
| C530   | C230K       |
| C540   | C240K       |
| C545   | C245K       |
| C555   | C255K       |

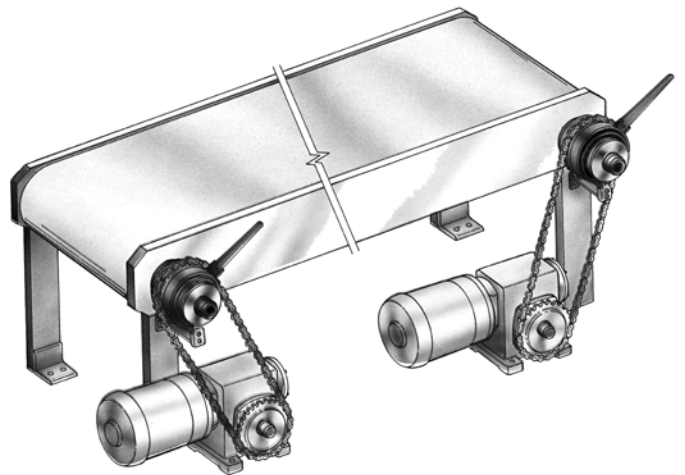
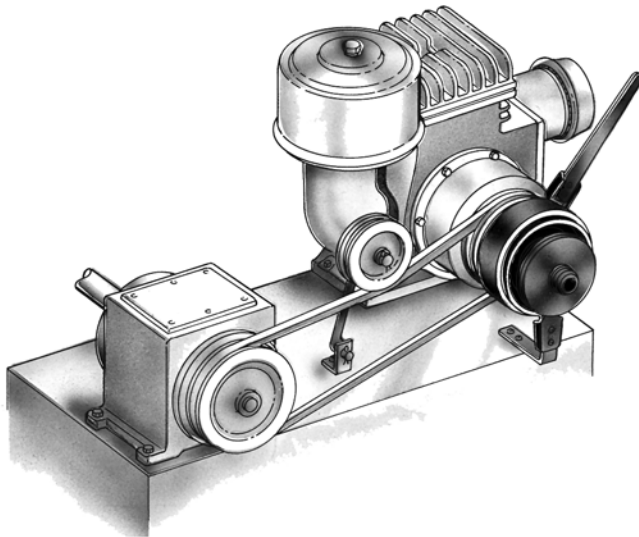
## Rebuild kits consist of:

Replacement friction disc  
Separator disc  
Belleville springs  
Snap rings

C4 kits rebuild dry and wet units

## Applications

Wood's Roto-Cam Clutches are used on a wide range of applications. With either gas engines or electric motors as the prime mover they see uses on conveyors, pumps, generator sets and agricultural equipment.



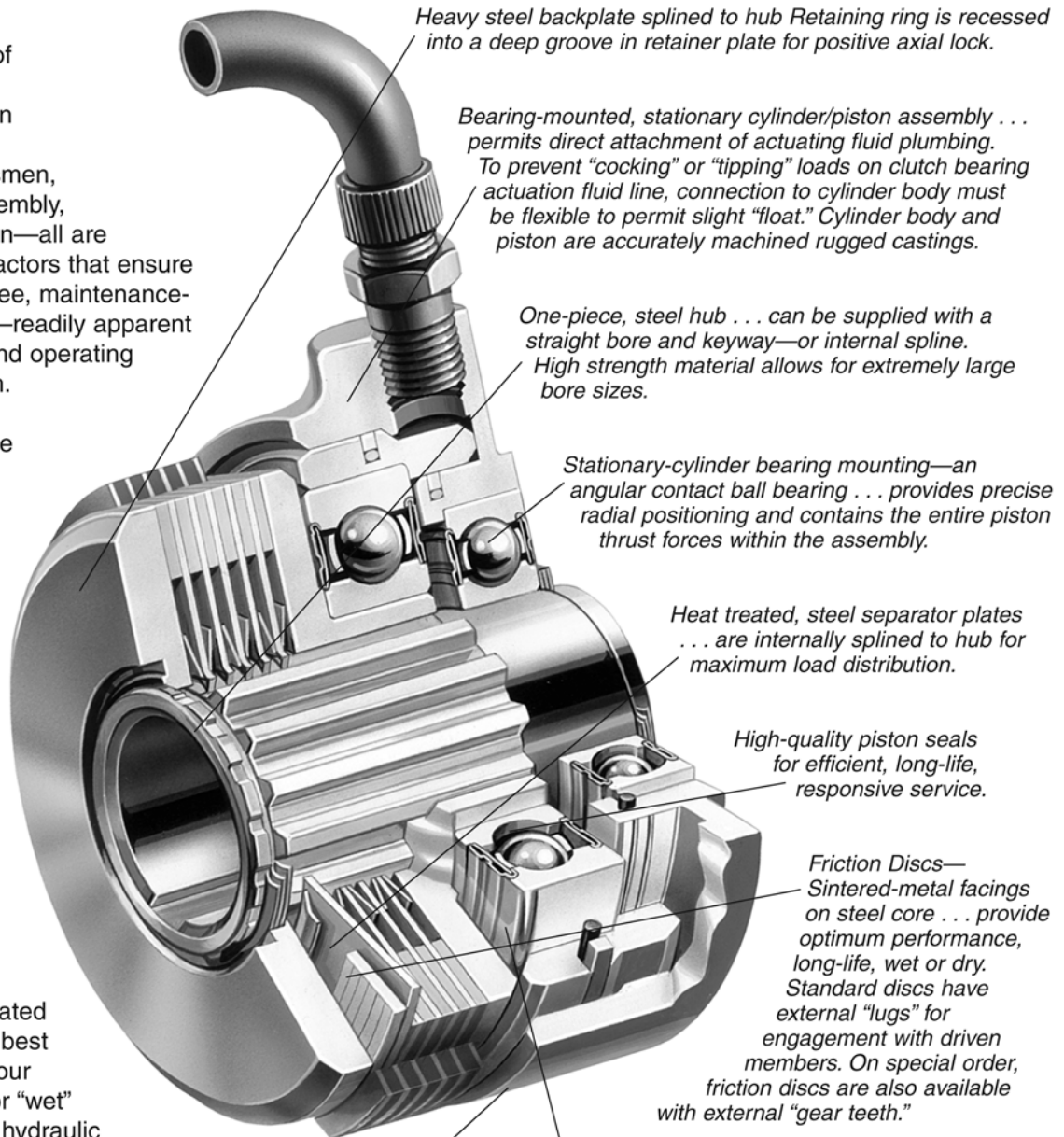
# DISC-O-TORQUE® Hydraulic Clutches

## SECTION G2

Careful selection of highest-quality materials, precision manufacturing by experienced craftsmen, conscientious assembly, and rigid inspection—all are important Value-Factors that ensure long-life, trouble-free, maintenance-free performance—readily apparent upon examining and operating a Model D2 Clutch.

- Maximum torque
- Minimum size
- Absorbs maximum energy
- Self-contained
- Minimum idle resistance
- Smooth, fast response
- Low installation costs
- Predictable life
- Uniform performance

Wood's Fluid-Actuated Clutches are your best choice. Whether your application calls for "wet" or "dry" operation; hydraulic or pneumatic actuation; stationary or rotating cylinders; you can specify it from Wood's usually right from this catalog.



Heavy steel backplate splined to hub Retaining ring is recessed into a deep groove in retainer plate for positive axial lock.

Bearing-mounted, stationary cylinder/piston assembly . . . permits direct attachment of actuating fluid plumbing. To prevent "cocking" or "tipping" loads on clutch bearing actuation fluid line, connection to cylinder body must be flexible to permit slight "float." Cylinder body and piston are accurately machined rugged castings.

One-piece, steel hub . . . can be supplied with a straight bore and keyway—or internal spline. High strength material allows for extremely large bore sizes.

Stationary-cylinder bearing mounting—an angular contact ball bearing . . . provides precise radial positioning and contains the entire piston thrust forces within the assembly.

Heat treated, steel separator plates . . . are internally splined to hub for maximum load distribution.

High-quality piston seals for efficient, long-life, responsive service.

Friction Discs—Sintered-metal facings on steel core . . . provide optimum performance, long-life, wet or dry. Standard discs have external "lugs" for engagement with driven members. On special order, friction discs are also available with external "gear teeth."

Precision roller thrust bearing carries only piston thrust and provides the reaction between the precision disc pack and the pressurized piston cylinder assembly.

Auxiliary Lube Port  
Positive lubrication is provided by a separate system which provides for a continuous flow of lubricant for bearing cooling, lubricity and separation of actuating fluid and lubricant. If an external lubrication source is available or if actuating fluid is to be used for lubrication, either can be readily accommodated by standard catalog models.







# DISC-O-TORQUE® Selection Procedure

## Easy Step by Step Selection Method

### Step # 1: Calculate Load Torque.

$$\text{Load Torque (ft. lbs)} = \frac{\text{HP} \times 5250}{\text{RPM}}$$

### Step # 2: Select service factor based on prime mover and driven equipment.

| DRIVEN EQUIPMENT LOAD CLASSIFICATIONS                              |  |  |   |  |
|--|--|--|---|--|
|  | LIGHT STEADY LOADS<br>Starting torque is equal to or slightly greater than running torque  | MODERATE LOADS<br>High starting torque or above average running torque.  | MEDIUM LOADS<br>Starting torque is approximately double running torque.   | HEAVY-DUTY LOADS<br>High starting torque, shock loading, light torque reversals during drive.  |
|  |   |   |    |   |
|  | Centrifugal pumps, uniformly loaded conveyors, light-duty fans and blowers, liquid mixers and agitators, centrifugal compressors, lobe and vane type blowers, gear pumps, textile machinery, wood-working machinery. | Machine tools, hot oil pumps, heavy-duty centrifugal pumps cooling towers, slurry agitators, boiler feed pumps, hoists, conveyors. | Dredge pumps, dynamometer drives, light-duty hammermills, lineshafts, paper-converting machinery rotary kilns, rotary or screw-type pumps for high viscosity fluids, paper mill cranes. | Mine ventilating fans, reciprocating pumps or compressors, paper making machinery, heavy-duty hammer-mills, ore crushers, pulverizing mills. |
| PRIME MOVER  |  |  |   |  |
| Steam, gas or air turbine  | 1.00   | 1.25   | 1.50  | 2.50   |
| AC electric motor  | 1.25   | 1.50   | 1.50  | 2.50   |
| DC electric motor or DOL start AC electric motor, hydraulic motors | 1.25   | 1.50   | 1.75  | 3.00   |
| Gasoline, natural gas, propane or other spark ignition engine      | 1.75   | 1.75   | 2.50  | CONSULT ENGINEERING  |
| Diesel*  | 2.50   | CONSULT ENGINEERING  |   |  |

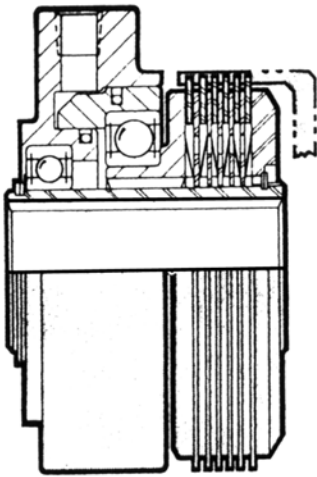
\* Gear tooth friction discs may be required, consult Wood's.

### Step # 3: Calculate Design Torque.

$$\text{Design Torque} = \text{Load Torque} \times \text{Service Factor}$$

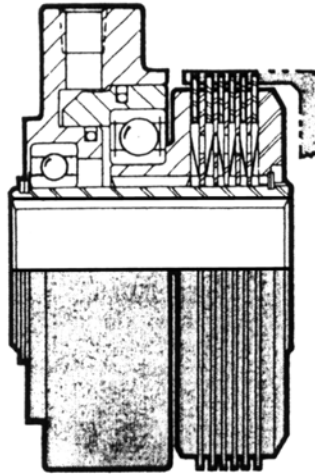
# DISC-O-TORQUE® Selection Procedure (continued)

Step # 4: Determine the most suitable clutch type.



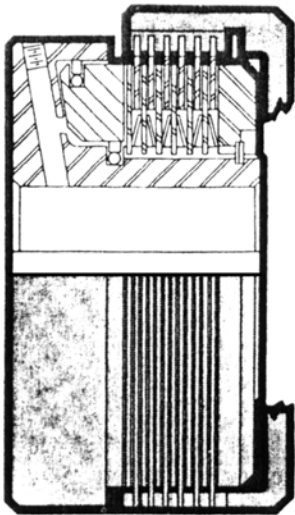
**Type D2**

This unit is designed with prelubricated bearings which are sealed. This "dry" assembly requires no further lubrication. This type may be actuated with air or oil from stock.



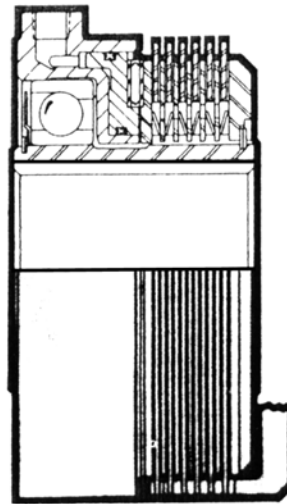
**Type D3**

This unit requires external lubrication in order to keep the bearings and friction disc cool. The friction disc requires splash or spray lubrication to comply with catalog ratings. The bearings should be lubed by spray, splash, or direct means.



**Type D4**

Actuation oil, on this type, is supplied thru the shaft rather than external porting. This eliminates the need for bearings, and allows the unit to be more compact. The torque capacity of this compact unit is extremely high.



**Type D5**

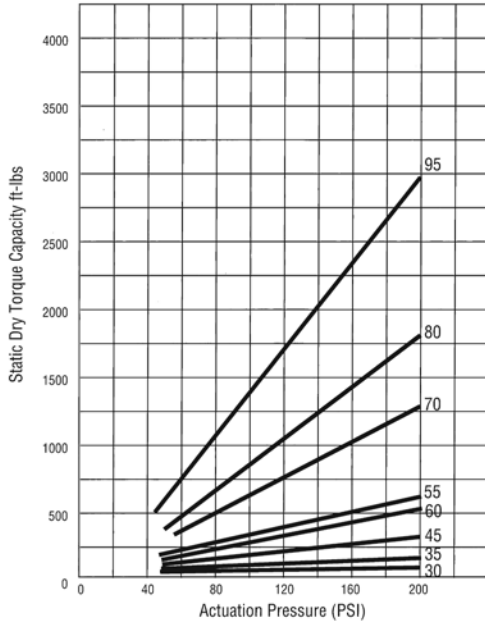
This type has a separate port for direct continuous lubrication of the bearings. External spray or splash lubrication of the friction disc is required. This type is primarily utilized in transmission cases.

# DISC-O-TORQUE® Selection Procedure (continued)

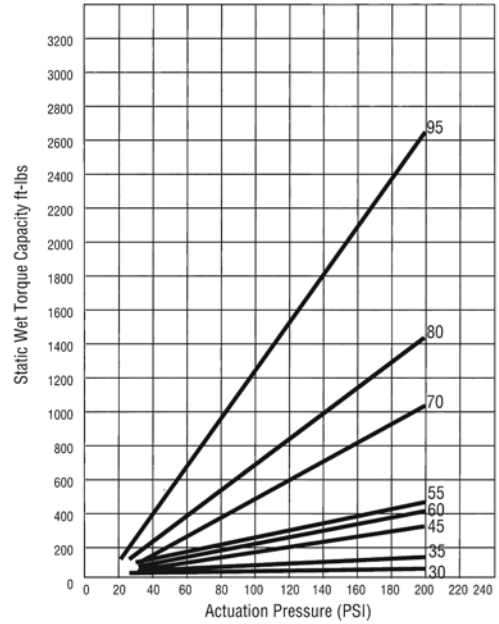
**Step # 5: Using the charts below determine the clutch size.**

Use design torque (step 3) and your available actuating pressure  
 Design torque and actuating pressure should intersect at or below the correct size.

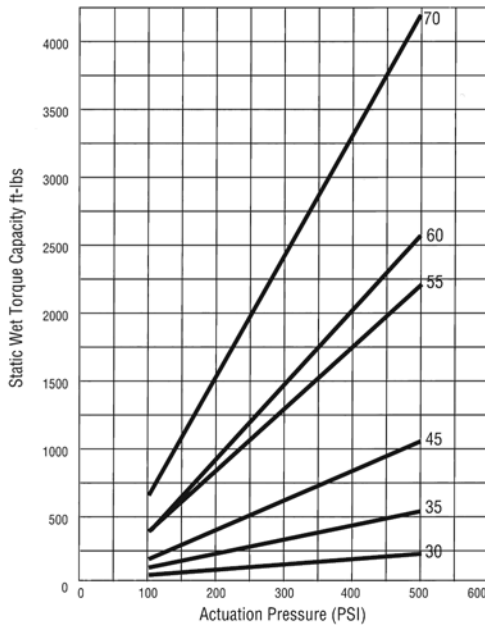
## Type D2



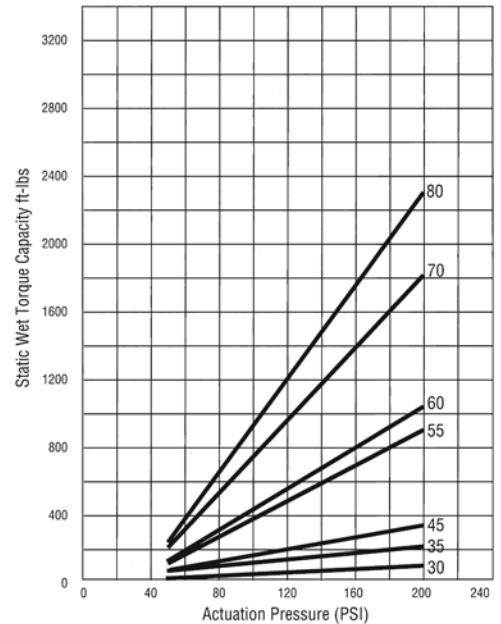
## Type D3



## Type D4



## Type D5



**Static Torque is when the clutch is fully engaged. Dynamic torque is prior to full engagement and “lock-up.” The relationship between dynamic and static torque can be seen in step #7.**

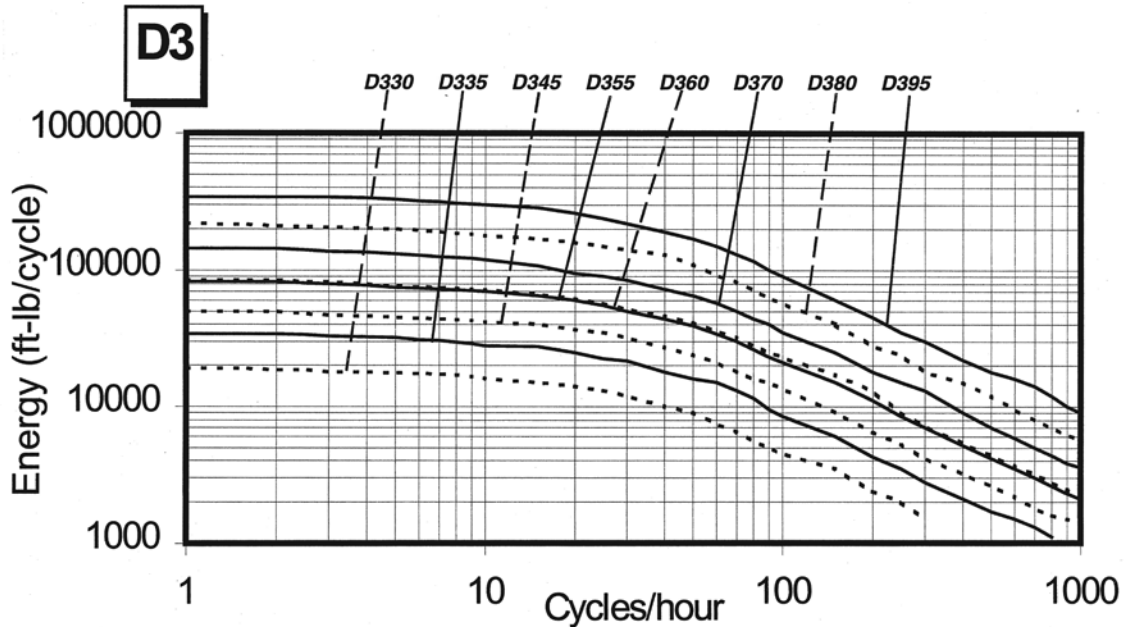
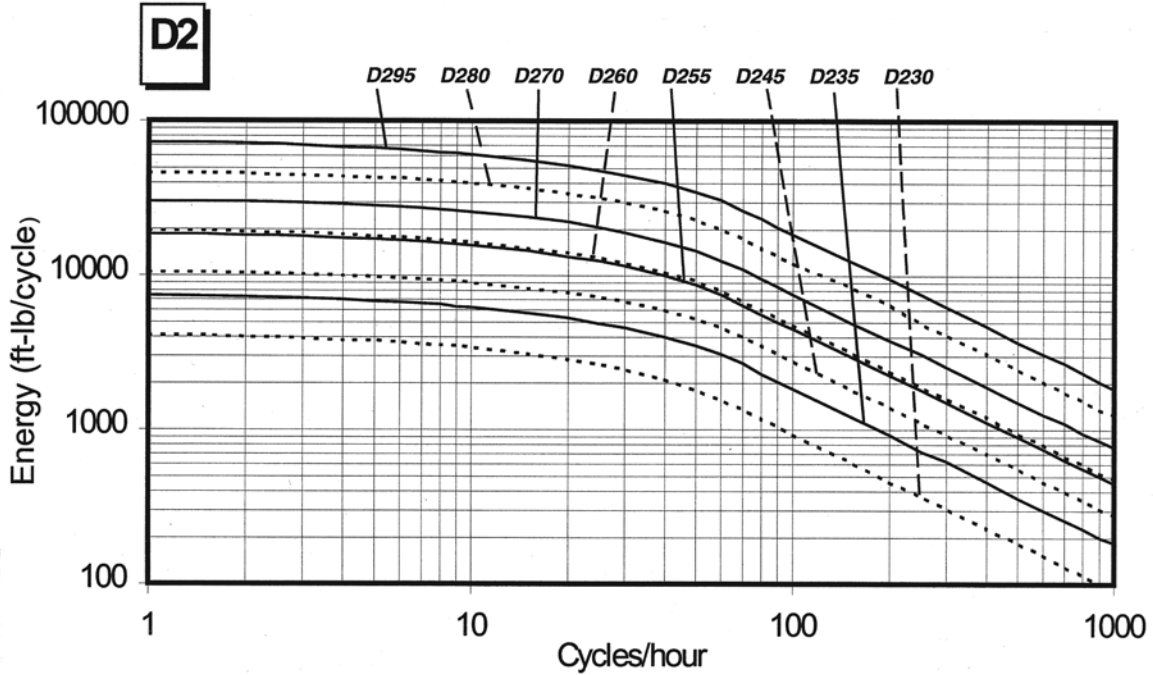


# DISC-O-TORQUE® Selection Procedure (continued)

## Step # 6: Verify the clutch energy capacity.

$$KE = .00017 \times (WR^2c) \times (Ni^2 - Nf^2) \text{ ft.lbs./cycle}$$

.00017 = constant       $WR^2c$  = Inertia @ clutch (lbs. ft<sup>2</sup>)  
 Ni = Initial RPM      Nf = Final RPM



The cooling rates represented by the curves are based on an external lubrication flow of 1.0 gallon per minute through the disc pack.

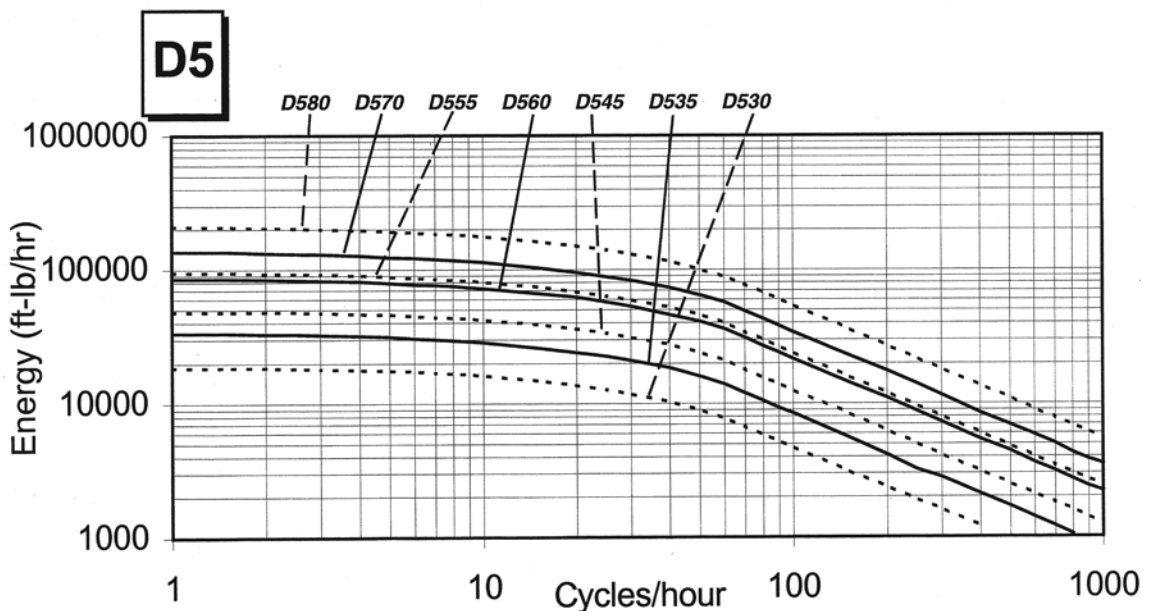
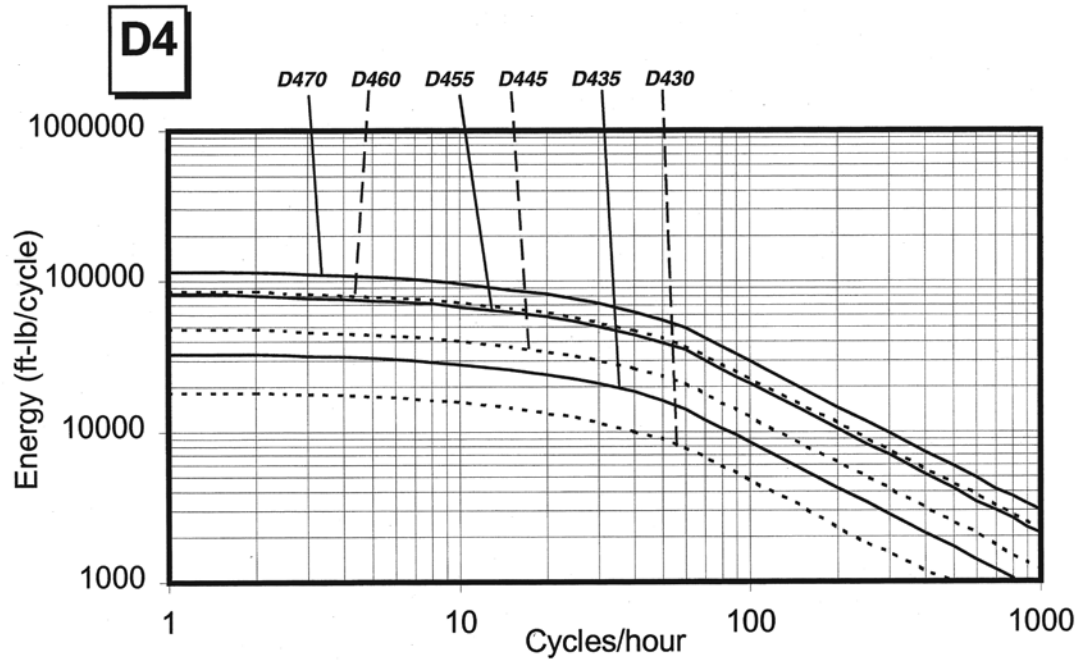
# DISC-O-TORQUE® Selection Procedure (continued)

If the clutch rotates at a speed different than the driven machine, the inertia ( $WR^2$ ) of the driven machine relative to the clutch may be calculated as follows.

$$WR^2c = WR^2dn \times (RPMdn / RPMc)^2$$

|   |                                |
|---|--------------------------------|
| $WR^2c$ = Inertia @ clutch (lbs. ft <sup>2</sup> )          | $RPMc$ = rpm @ clutch          |
| $WR^2dn$ = Inertia @ driven machine (lbs. ft <sup>2</sup> ) | $RPMdn$ = rpm @ driven machine |

**If the intersection of the KE value and the number of cycles per hour is at or below the clutch selected in step 5 the selection is correct. If the intersection is above the line, reselect a larger clutch based on these charts.**



# DISC-O-TORQUE® Selection Procedure (continued)

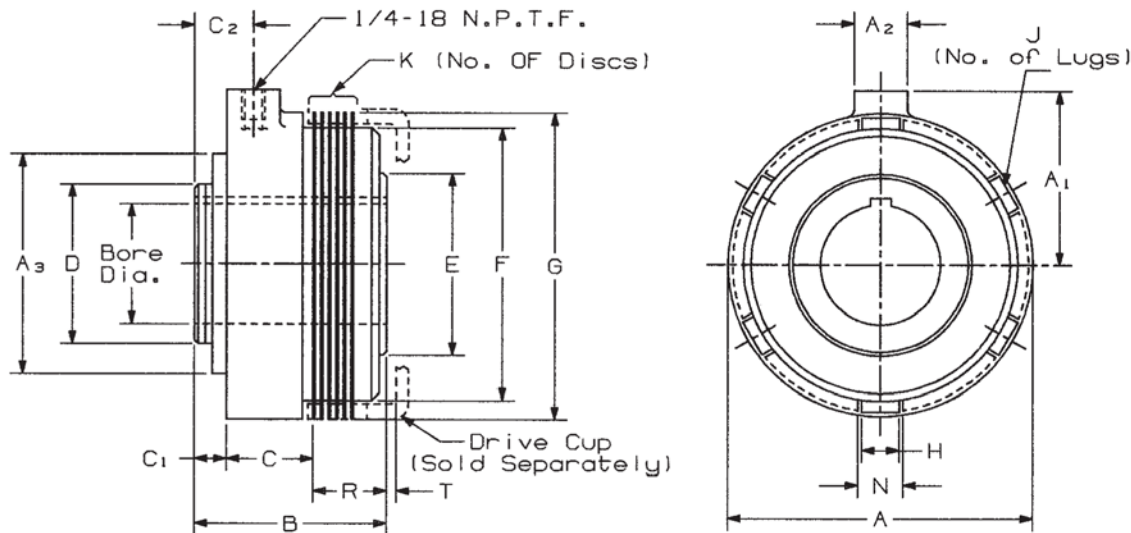
**Step # 7: Check clutch dimensions to verify fit in application space envelope.**

## D2 & D3 DIMENSIONS

|    |                   | 30    | 35    | 45    | 55    | 60    | 70    | 80    | 95    |
|----|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| A  | Body O.D.         | 3.38  | 3.94  | 4.88  | 6     | 6.56  | 7.56  | 8.62  | 10.38 |
| A1 | Boss Height       | 2.50  | 2.75  | 3.19  | 3.75  | 4     | 4.44  | 4.94  | 5.62  |
| A2 | Boss Width        | 0.88  | 0.88  | 0.88  | 0.88  | 1     | 1     | 1     | 1     |
| A3 | Cylinder Diameter | 2.56  | 3.12  | 3.62  | 4.50  | 5.00  | 5.75  | 6.62  | 7.75  |
| B  | Axial Length      | 2.625 | 2.875 | 3.317 | 3.517 | 3.940 | 4.380 | 4.825 | 6.005 |
| C  | Cylinder Width    | 1.19  | 1.25  | 1.41  | 1.62  | 1.69  | 1.75  | 2.03  | 2.56  |
| C1 | Hub Extension     | 0.31  | 0.44  | 0.38  | 0.34  | 0.44  | 0.56  | 0.44  | 0.34  |
| C2 | Port Location     | 0.75  | 0.88  | 0.88  | 0.81  | 0.94  | 1.06  | 1.12  | 1.16  |
| D  | Hub O.D. (rear)   | 1.19  | 1.56  | 2     | 2.56  | 2.94  | 3.34  | 3.94  | 4.72  |
| E  | Hub O.D. (front)  | 1.33  | 1.50  | 2.12  | 2.69  | 3.06  | 3.55  | 4     | 4.75  |
| F  | Disc Minor O.D.   | 3     | 3.50  | 4.50  | 5.50  | 6     | 7     | 8     | 9.50  |
| G  | Disc Major O.D.   | 3.31  | 3.81  | 4.88  | 6     | 6.56  | 7.62  | 8.62  | *     |
| H  | Disc Lug Width    | 0.734 | 0.734 | 0.796 | 0.609 | 0.609 | 0.734 | 0.734 | *     |
| J  | No. of Lugs       | 6     | 6     | 6     | 12    | 12    | 12    | 12    | *     |
| K  | No. of Disc       | 6     | 6     | 6     | 6     | 6     | 7     | 7     | 7     |
| N  | Slot Width        | 0.750 | 0.750 | 0.812 | 0.625 | 0.625 | 0.750 | 0.750 | *     |
| R  | Engagement Length | 0.964 | 1.0   | 1.225 | 1.350 | 1.525 | 1.765 | 1.906 | 2.680 |
| T  | Gap to Drive Cup  | 0.106 | 0.160 | 0.145 | 0.300 | 0.145 | 0.075 | 0.114 | 0.350 |

|          |                              | 30          | 35           | 45           | 55           | 60           | 70           | 80            | 95            |
|----------|------------------------------|-------------|--------------|--------------|--------------|--------------|--------------|---------------|---------------|
| D2       | Dynamic torque dry @ 150 PSI | 67 ft. lbs. | 104 ft. lbs. | 210 ft. lbs. | 380 ft. lbs. | 348 ft. lbs. | 771 ft. lbs. | 1080 ft. lbs. | 1776 ft. lbs. |
|          | Static torque dry @ 150 PSI  | 80 ft. lbs. | 124 ft. lbs. | 251 ft. lbs. | 455 ft. lbs. | 417 ft. lbs. | 923 ft. lbs. | 1294 ft. lbs. | 2125 ft. lbs. |
| D3       | Dynamic torque wet @ 150 PSI | 49 ft. lbs. | 77 ft. lbs.  | 155 ft. lbs. | 281 ft. lbs. | 257 ft. lbs. | 570 ft. lbs. | 798 ft. lbs.  | 1383 ft. lbs. |
|          | Static torque wet @ 150 PSI  | 65 ft. lbs. | 101 ft. lbs. | 205 ft. lbs. | 371 ft. lbs. | 340 ft. lbs. | 753 ft. lbs. | 1055 ft. lbs. | 1966 ft. lbs. |
| MAX BORE |                              | .875        | 1.125        | 1.500        | 2.000        | 2.375        | 2.625        | 3.250         | 3.875         |

**Rated up to 200 PSI. For other actuation pressures, refer to Chart in Step #5.**





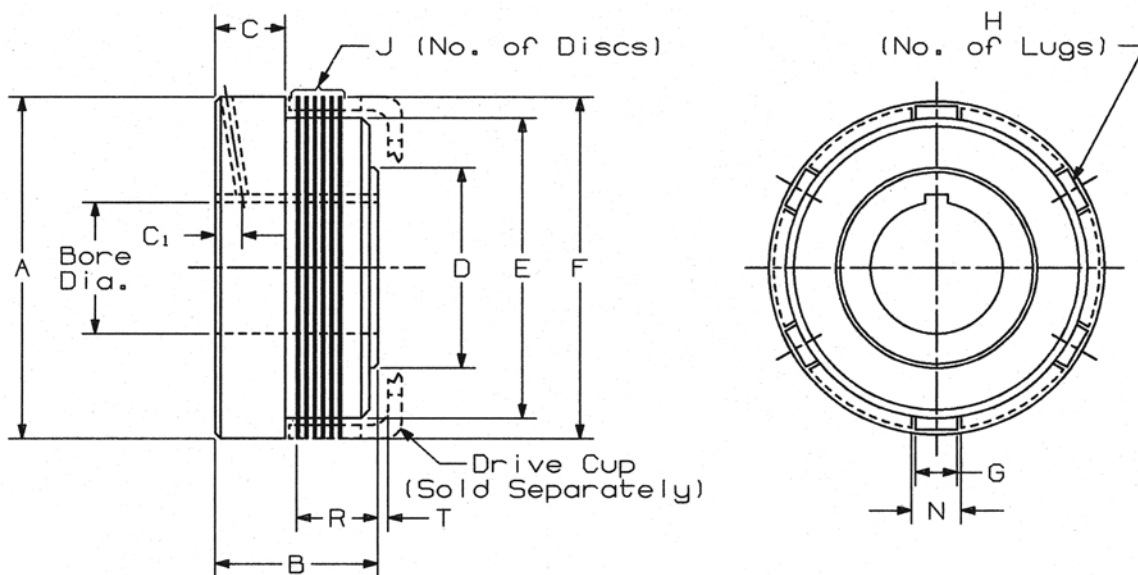
# DISC-O-TORQUE® Selection Procedure (continued)

## D4 DIMENSIONS

|    |                   | 30                                   | 35    | 45    | 55    | 60    | 70    |
|----|-------------------|--------------------------------------|-------|-------|-------|-------|-------|
| A  | Body O.D.         | 3.38                                 | 3.81  | 4.88  | 6     | 6.56  | 7.62  |
| B  | Axial Length      | 1.880                                | 27    | 2.320 | 2.745 | 2.780 | 3.132 |
| C  | Cylinder Width    | 0.84                                 | 0.84  | 0.96  | 1     | 1.06  | 1.14  |
| C1 | Port Location     | See Product Number Listing (STEP #8) |       |       |       |       |       |
| D  | Hub O.D. (rear)   | 1.88                                 | 2     | 2.75  | 3.12  | 3.62  | 4     |
| E  | Disc Minor O.D.   | 3                                    | 3.50  | 4.50  | 5.50  | 6     | 7     |
| F  | Disc Major O.D.   | 3.31                                 | 3.81  | 4.88  | 6     | 6.56  | 7.62  |
| G  | Disc Lug Width    | 0.734                                | 0.734 | 0.796 | 0.609 | 0.609 | 0.734 |
| H  | No. of Lugs       | 6                                    | 6     | 6     | 12    | 12    | 12    |
| J  | No. of Disc       | 6                                    | 6     | 6     | 6     | 6     | 6     |
| N  | Slot Width        | 0.750                                | 0.750 | 0.812 | 0.625 | 0.625 | 0.750 |
| R  | Engagement Length | 0.977                                | 1.065 | 1.245 | 1.562 | 1.575 | 1.775 |
| T  | Gap to Drive Cup  | 0.093                                | 0.095 | 0.125 | 0.089 | 0.095 | 0.065 |

|          |                              | 30          | 35           | 45           | 55           | 60           | 70            |
|----------|------------------------------|-------------|--------------|--------------|--------------|--------------|---------------|
| D4       | Dynamic torque wet @ 150 PSI | 50 ft. lbs. | 101 ft. lbs. | 188 ft. lbs. | 449 ft. lbs. | 466 ft. lbs. | 816 ft. lbs.  |
|          | Static torque wet @150 PSI   | 66 ft. lbs. | 134 ft. lbs. | 249 ft. lbs. | 594 ft. lbs. | 617 ft. lbs. | 1080 ft. lbs. |
| MAX BORE |                              | 1.312       | 1.500        | 2.125        | 2.4375       | 2.9375       | 3.250         |

**Rated up to 500 PSI. For other actuation pressures, refer to Chart in Step #5.**



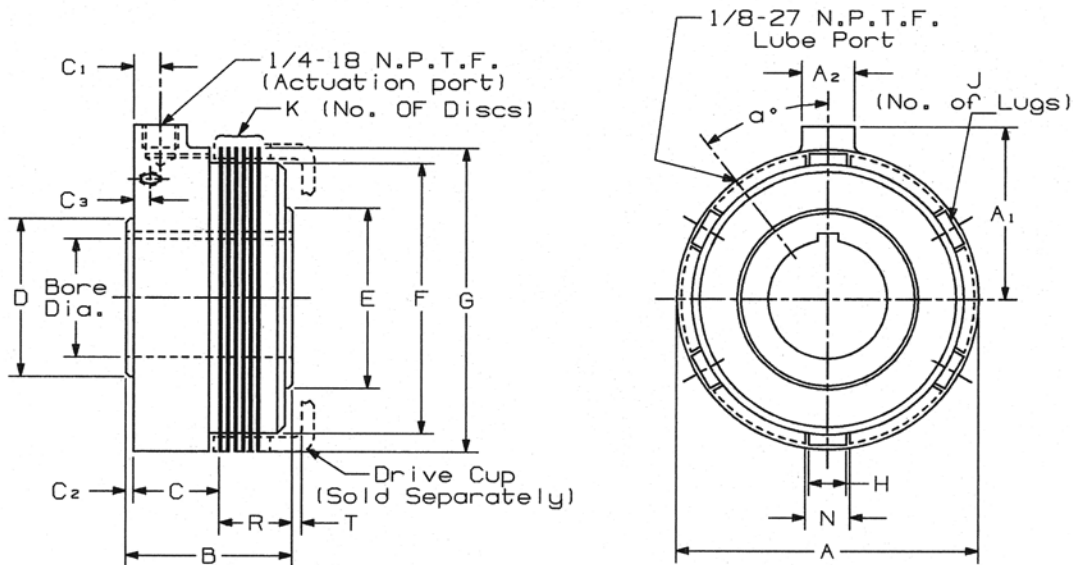
# DISC-O-TORQUE® Selection Procedure (continued)

## D5 DIMENSIONS

|    |                    | 30    | 35    | 45    | 55    | 60    | 70    | 80    |
|----|--------------------|-------|-------|-------|-------|-------|-------|-------|
| A  | Body O.D.          | 3.31  | 3.94  | 4.88  | 6     | 6.56  | 7.75  | 8.62  |
| A1 | Boss Height        | 2.03  | 2.34  | 2.81  | 3.38  | 3.69  | 4.19  | 4.69  |
| A2 | Boss Diameter      | 0.88  | 0.88  | 0.88  | 0.88  | 0.88  | 1.00  | 1.00  |
| B  | Axial Length       | 2.265 | 2.385 | 2.880 | 3.260 | 3.445 | 3.785 | 4.160 |
| C  | Cylinder Width     | 1.19  | 1.25  | 1.44  | 1.59  | 1.72  | 1.81  | 2.09  |
| C1 | Port Location      | 0.44  | 0.50  | 0.44  | 0.50  | 0.50  | 0.56  | 0.56  |
| C2 | Hub Extension      | 0.03  | 0.03  | 0.03  | 0.03  | 0.03  | 0.09  | 0.03  |
| C3 | Lube Port Location | 0.44  | 0.50  | 0.44  | 0.50  | 0.50  | 0.56  | 0.69  |
| a° | Lube Port Location | 30    | 30    | 30    | 30    | 15    | 15    | 15    |
| D  | Hub O.D. (rear)    | 1.56  | 1.97  | 2.56  | 2.95  | 3.53  | 4.12  | 4.72  |
| E  | Hub O.D. (front)   | 1.94  | 2.02  | 2.75  | 3.09  | 3.62  | 4.00  | 4.75  |
| F  | Disc Minor O.D.    | 3     | 3.50  | 4.50  | 5.50  | 6.00  | 7.00  | 8.00  |
| G  | Disc Major O.D.    | 3.31  | 3.94  | 4.88  | 6.00  | 6.56  | 7.62  | 8.62  |
| H  | Disc Lug Width     | 0.734 | 0.734 | 0.796 | 0.609 | 0.609 | 0.734 | 0.734 |
| J  | No. of Lugs        | 6     | 6     | 6     | 12    | 12    | 12    | 12    |
| K  | No. of Disc        | 6     | 6     | 6     | 7     | 6     | 7     | 7     |
| N  | Slot Width         | 0.750 | 0.750 | 0.812 | 0.625 | 0.625 | 0.750 | 0.750 |
| R  | Engagement Length  | 0.922 | 1.0   | 1.225 | 1.452 | 1.525 | 1.706 | 1.875 |
| T  | Gap to Drive Cup   | 0.148 | 0.160 | 0.145 | 0.198 | 0.145 | 0.075 | 0.145 |

|          |                              | 30          | 35           | 45           | 55           | 60           | 70            | 80            |
|----------|------------------------------|-------------|--------------|--------------|--------------|--------------|---------------|---------------|
| D5       | Dynamic torque wet @ 150 PSI | 72 ft. lbs. | 125 ft. lbs. | 227 ft. lbs. | 530 ft. lbs. | 587 ft. lbs. | 985 ft. lbs.  | 1250 ft. lbs. |
|          | Static torque wet @150 PSI   | 95 ft. lbs. | 165 ft. lbs. | 300 ft. lbs. | 700 ft. lbs. | 775 ft. lbs. | 1300 ft. lbs. | 1650 ft. lbs. |
| MAX BORE |                              | 1.250       | 1.500        | 2.000        | 2.375        | 3.000        | 3.250         | 3.875         |

**Rated up to 200 PSI. For other actuation pressures, refer to Chart in Step #5.**

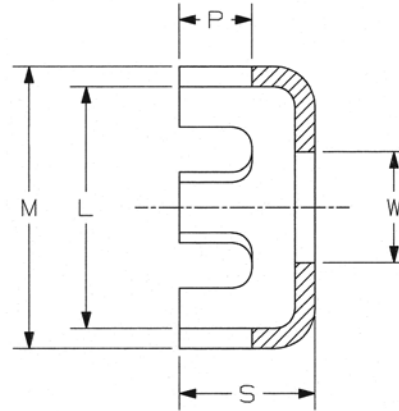


# DISC-O-TORQUE® Selection Procedure (continued)

## Drive Cup Dimensions

Used with all clutch types. - Sold separately

Drive cups are normally supplied slotted for engagement with the lugs of the friction disc, however on special order the disc and drive cup can be made with gear teeth for driving. The K dimension indicates the number of gear teeth on these units.



|   |                       | 30    | 35    | 45    | 55    | 60    | 70    | 80    | 95    |
|---|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| L | I.D.                  | 3.062 | 3.562 | 4.562 | 5.562 | 6.062 | 7.062 | 8.062 | *     |
| M | O.D.                  | 3.310 | 3.880 | 4.880 | 5.940 | 6.560 | 7.690 | 8.690 | *     |
| P | Slot Length           | 0.840 | 0.890 | 1.000 | 1.270 | 1.280 | 1.410 | 1.530 | *     |
| S | Cup Length            | 1.250 | 1.380 | 1.650 | 1.960 | 2.050 | 2.220 | 2.400 | 3.370 |
| W | Min. Cup Bore         | 1.000 | 1.000 | 1.000 | 1.500 | 2.000 | 2.000 | 2.500 | 3.500 |
| K | No. Teeth (Gear Type) | 33    | 38    | 48    | 58    | 63    | 73    | 83    | 119   |

## Step # 8: Ordering clutch and drive cup.

### Drive Cup: (MUST BE ORDERED SEPARATELY)

The drive cups are the same for all clutch types. For hardened or gear style drive cup consult Wood's.

| SIZE | DRIVE CUP   |
|------|-------------|
|      | Product No. |
| 30   | D530DC      |
| 35   | D535DC      |
| 45   | D545DC      |
| 55   | D555DC      |

| SIZE | DRIVE CUP      |
|------|----------------|
|      | Product No.    |
| 60   | D560DC         |
| 70   | D570DC         |
| 80   | D580DC         |
| 95   | Consult Wood's |

On D4 clutches with activation pressures above 300 PSI, a gear style drive cup is recommended.

**Order example:** For a D355 clutch drive cup order **D555DC**

### Clutch:

Product number break down

For a **D460 X 2-1/4** order **D460214**



### Additional ordering considerations:

Type D5 clutches are available with the following bearing lube options.

**Lube Type I** - For lubricating the bearings with the axiliary lube port. (standard)

**Lube Type II** - For lubricating the needle thrust bearing only with actuating fluid. The angular contact bearing must be lubricated by external spray, mist or splash.

**Lube Type III** - Bearing lubrication not using Type I or II, but using an external spray mist or splash.

**Lube Type IV** - For application using Type I and II above for lubrication.

**When ordering a D5 clutch note your Lube Type.**

# DISC-O-TORQUE® Product Numbers

| D2                        |                |          |
|---------------------------|----------------|----------|
| Clutch Description        | Product Number | Wt. Lbs. |
| D230 X 1/2 RB             | D230RB         | 4.0      |
| D230 X 5/8                | D23058         | 4.0      |
| D230 X 3/4                | D23034         | 4.0      |
| D235 X 5/8 RB             | D235RB         | 6.0      |
| D235 X 7/8                | D23578         | 6.0      |
| D235 X 1                  | D2351          | 6.0      |
| D245 X 7/8 RB             | D245RB         | 11.0     |
| D245 X 1-1/8              | D245118        | 11.0     |
| D245 X 1-1/4              | D245114        | 11.0     |
| D255 X 1-1/8 RB           | D255RB         | 18.0     |
| D255 X 1-1/2              | D255112        | 18.0     |
| D255 X 1-5/8              | D255158        | 18.0     |
| D255 X 1-3/4              | D255134        | 18.0     |
| D260 X 1-1/4 RB           | D260RB         | 25.0     |
| D260 X 2                  | D2602          | 25.0     |
| D260 X 2-1/8              | D260218        | 25.0     |
| D270 X 1-1/2 RB           | D270RB         | 34.0     |
| D270 X 2-1/4              | D270214        | 34.0     |
| D270 X 2-1/2              | D270212        | 34.0     |
| D280 X 1-7/8 RB           | D280RB         | 49.0     |
| D280 X 2-3/4              | D280234        | 49.0     |
| D280 X 3                  | D2803          | 49.0     |
| D295 - SPECIAL ORDER ONLY |                | 60.0     |

| D3                        |                |          |
|---------------------------|----------------|----------|
| Clutch Description        | Product Number | Wt. Lbs. |
| D330 X 1/2 RB             | D330RB         | 4.0      |
| D330 X 5/8                | D33058         | 4.0      |
| D330 X 3/4                | D33034         | 4.0      |
| D335 X 5/8 RB             | D335RB         | 6.0      |
| D335 X 7/8                | D33578         | 6.0      |
| D335 X 1                  | D3351          | 6.0      |
| D345 X 7/8 RB             | D345RB         | 11.0     |
| D345 X 1-1/8              | D345118        | 11.0     |
| D345 X 1-1/4              | D345114        | 11.0     |
| D355 X 1-1/8 RB           | D355RB         | 18.0     |
| D355 X 1-1/2              | D355112        | 18.0     |
| D355 X 1-5/8              | D355158        | 18.0     |
| D355 X 1-3/4              | D355134        | 18.0     |
| D360 X 1-1/4 RB           | D360RB         | 25.0     |
| D360 X 2                  | D3602          | 25.0     |
| D360 X 2-1/8              | D360218        | 25.0     |
| D370 X 1-1/2 RB           | D370RB         | 34.0     |
| D370 X 2-1/4              | D370214        | 34.0     |
| D370 X 2-1/2              | D370212        | 34.0     |
| D380 X 1-7/8 RB           | D380RB         | 49.0     |
| D380 X 2-3/4              | D380234        | 49.0     |
| D380 X 3                  | D3803          | 49.0     |
| D395 - SPECIAL ORDER ONLY |                | 60.0     |

## DISC-O-TORQUE DESIGNATOR CHART

| NEW | OLD |
|-----|-----|
| D2  | STD |
| D3  | STH |
| D4  | RO  |
| D5  | HTH |

| D4                 |                |          |         |
|--------------------|----------------|----------|---------|
| Clutch Description | Product Number | Wt. Lbs. | C1 Dim. |
| D430 X 3/4 RB      | D430RB         | 3.5      | 0.410   |
| D430 X 7/8         | D43078         | 3.5      | 0.394   |
| D430 X 1           | D4301          | 3.5      | 0.382   |
| D430 X 1-1/8       | D430118        | 3.5      | 0.370   |
| D435 X 1 RB        | D435RB         | 5.0      | 0.380   |
| D435 X 1-1/8       | D435118        | 5.0      | 0.373   |
| D435 X 1-1/4       | D435114        | 5.0      | 0.364   |
| D435 X 1-3/8       | D435138        | 5.0      | 0.354   |
| D445 X 1-1/4 RB    | D445RB         | 9.0      | 0.500   |
| D445 X 1-3/8       | D445138        | 9.0      | 0.486   |
| D445 X 1-1/2       | D445112        | 9.0      | 0.476   |
| D445 X 1-5/8       | D445158        | 9.0      | 0.460   |
| D445 X 1-3/4       | D445134        | 9.0      | 0.452   |
| D455 X 1-1/2 RB    | D455RB         | 16.0     | 0.580   |
| D455 X 1-3/4       | D455134        | 16.0     | 0.563   |
| D455 X 1-7/8       | D455178        | 16.0     | 0.547   |
| D455 X 2           | D4552          | 16.0     | 0.537   |
| D455 X 2-1/4       | D455214        | 16.0     | 0.515   |
| D460 X 1-1/2 RB    | D460RB         | 20.0     | 0.630   |
| D460 X 2-1/4       | D460214        | 20.0     | 0.563   |
| D460 X 2-3/8       | D460238        | 20.0     | 0.553   |
| D460 X 2-1/2       | D460212        | 20.0     | 0.543   |
| D460 X 2-3/4       | D460234        | 20.0     | 0.524   |
| D470 X 1-3/4 RB    | D470RB         | 29.0     | 0.700   |
| D470 X 2-1/2       | D470212        | 29.0     | 0.645   |
| D470 X 2-5/8       | D470258        | 29.0     | 0.625   |
| D470 X 2-3/4       | D470234        | 29.0     | 0.610   |
| D470 X 3           | D4703          | 29.0     | 0.591   |

| D5                 |                |          |
|--------------------|----------------|----------|
| Clutch Description | Product Number | Wt. Lbs. |
| D530 X 1/2 RB      | D530RB         | 4.0      |
| D530 X 7/8         | D53078         | 4.0      |
| D530 X 1           | D5301          | 4.0      |
| D535 X 5/8 RB      | D535RB         | 6.5      |
| D535 X 1-1/8       | D535118        | 6.5      |
| D535 X 1-1/4       | D535114        | 6.5      |
| D545 X 7/8 RB      | D545RB         | 12.0     |
| D545 X 1-1/2       | D545112        | 12.0     |
| D545 X 1-3/4       | D545134        | 12.0     |
| D555 X 1-1/8 RB    | D555RB         | 19.0     |
| D555 X 1-7/8       | D555178        | 19.0     |
| D555 X 2           | D5552          | 19.0     |
| D560 X 1-1/4 RB    | D560RB         | 25.0     |
| D560 X 2           | D5602          | 25.0     |
| D560 X 2-1/4       | D560214        | 25.0     |
| D560 X 2-1/2       | D560212        | 25.0     |
| D570 X 1-3/4 RB    | D570RB         | 35.0     |
| D570 X 2-1/2       | D570212        | 35.0     |
| D570 X 2-3/4       | D570234        | 35.0     |
| D580 X 1-7/8 RB    | D580RB         | 51.0     |
| D580 X 2-3/4       | D580234        | 51.0     |
| D580 X 3           | D5803          | 51.0     |

*Wood's welcomes the making of specials and modification of stock to meet your application needs.*



# DISC-O-TORQUE® Repair Kits

| Clutch | Disc Kit | Seal Kit | Bearing Kit |
|--------|----------|----------|-------------|
| D230   | D230DK   | D230SK   | D230BK      |
| D235   | D235DK   | D235SK   | D235BK      |
| D245   | D245DK   | D245SK   | D245BK      |
| D255   | D255DK   | D255SK   | D255BK      |
| D260   | D260DK   | D260SK   | D260BK      |
| D270   | D270DK   | D270SK   | D270BK      |
| D280   | D280DK   | D280SK   | D280BK      |
| D295   | D295DK   | D295SK   | D295BK      |
| D330   | D230DK   | D230SK   | D330BK      |
| D335   | D235DK   | D235SK   | D335BK      |
| D345   | D245DK   | D245SK   | D345BK      |
| D355   | D255DK   | D255SK   | D355BK      |
| D360   | D260DK   | D260SK   | D360BK      |
| D370   | D270DK   | D270SK   | D370BK      |
| D380   | D280DK   | D280SK   | D380BK      |
| D395   | D295DK   | D295SK   | D395BK      |
| D430   | D430DK   | D430SK   | N/A         |
| D435   | D435DK   | D435SK   | N/A         |
| D445   | D445DK   | D445SK   | N/A         |
| D455   | D455DK   | D455SK   | N/A         |
| D460   | D460DK   | D460SK   | N/A         |
| D470   | D470DK   | D470SK   | N/A         |
| D530   | D530DK   | D530SK   | D530BK      |
| D535   | D535DK   | D535SK   | D535BK      |
| D545   | D545DK   | D545SK   | D545BK      |
| D555   | D555DK   | D555SK   | D555BK      |
| D560   | D560DK   | D560SK   | D560BK      |
| D570   | D570DK   | D570SK   | D570BK      |
| D580   | D580DK   | D580SK   | D580BK      |

Kits contain enough parts to repair one clutch.

## Disc Kit - (Formerly RK1)

CONTENTS :

Friction Disc  
Separating Disc  
Separator Spring  
Snap Rings

## Seal Kit - (Formerly RK2)

CONTENTS :

Piston Rings  
O-Rings

## Bearing Kit - (Formerly RK3)

CONTENTS :

Bearings  
Shims

\* D4 clutches do not have bearings.

## Mounting Considerations

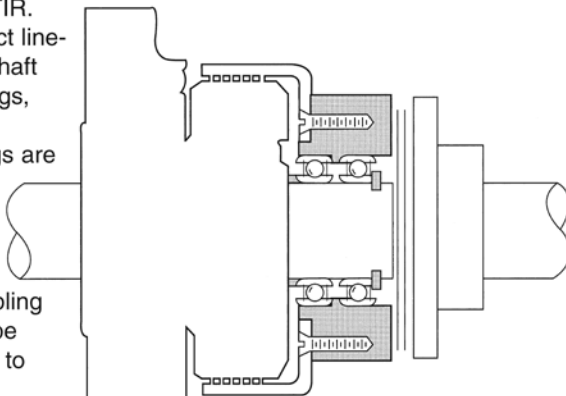
### In-line Shafts

For direct drive or in-line mounting the shafts should be closely aligned so that the cup will be concentric to the clutch. The cup and clutch should be aligned within .005 inches TIR.

For direct line-to-line shaft mountings, flexible couplings are preferable. One-half of the coupling should be secured to the cup.

Bearings should support the cup on the clutch shaft to maintain concentricity between the clutch and its cup.

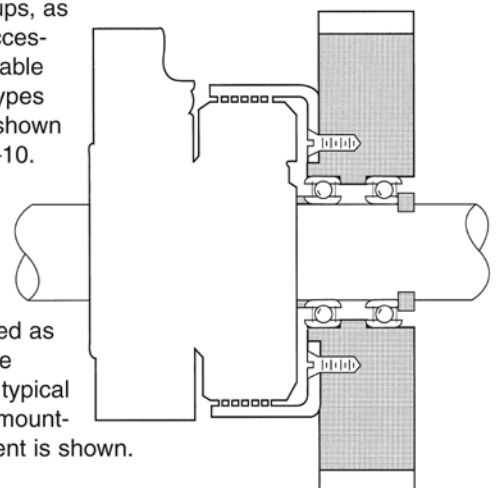
A typical flexible coupling in-line shaft direct-drive-mounting is shown.



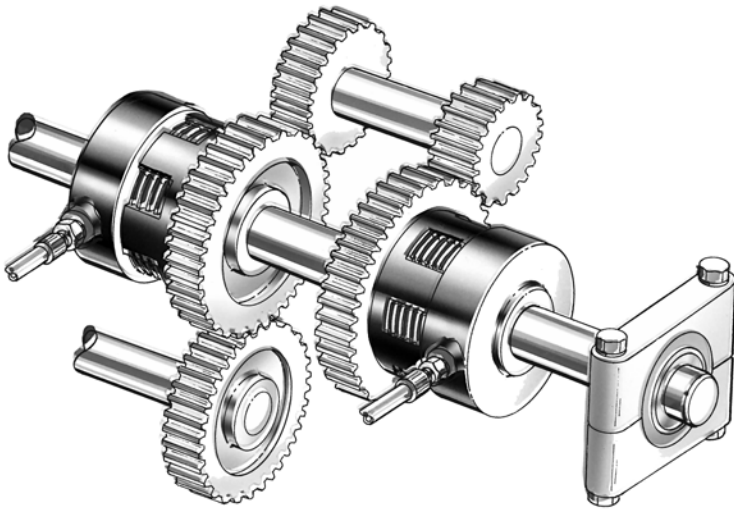
### Parallel Shafts

In parallel shaft applications, the cup is secured to a pulley, sprocket or gear. This cup/gear assembly must be bearing mounted on the clutch shaft. Drive cups, as an optional accessory, are available for all clutch types and sizes as shown on page G3—10.

Cups are furnished with a rough bore as standard and can be modified as required by the application. A typical parallel shaft mounting arrangement is shown.

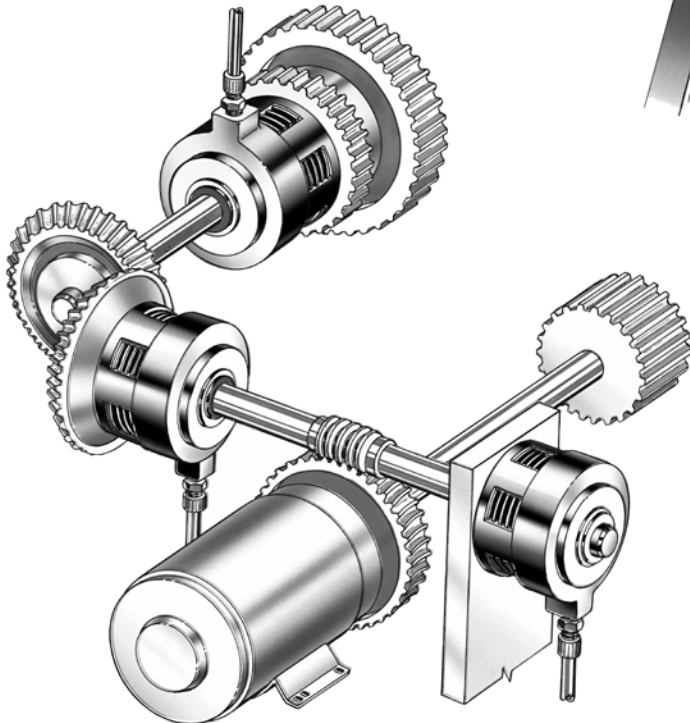
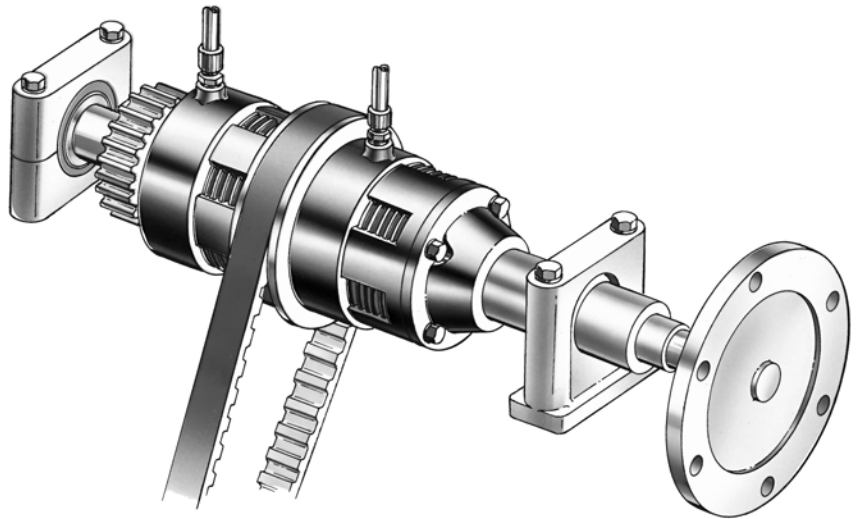


# DISC-O-TORQUE® Applications



By switching between the two clutches the speed of the driven shaft will change. This allows for different gear ratios and machine speeds.

In this clutch brake application one hydraulic clutch is used to engage the spindle or chuck and upon disengagement the other is used to brake the load.



Hydraulic clutches are used in machine tool applications for indexing and speed changes.

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Huco  
Lamiflex Couplings  
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Boston Gear  
Delroyd Worm Gear  
Nuttall Gear



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