

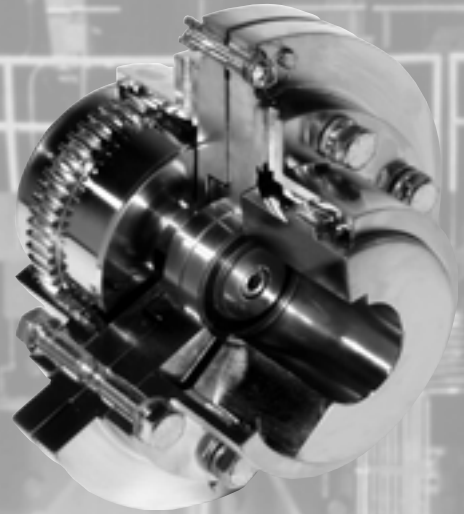
# KOP-FLEX®

## Torque Overload Release Couplings

### Series H Shear Pin Cartridge

### FAST'S® Shear Pin

### FAST'S® Breaking Pin

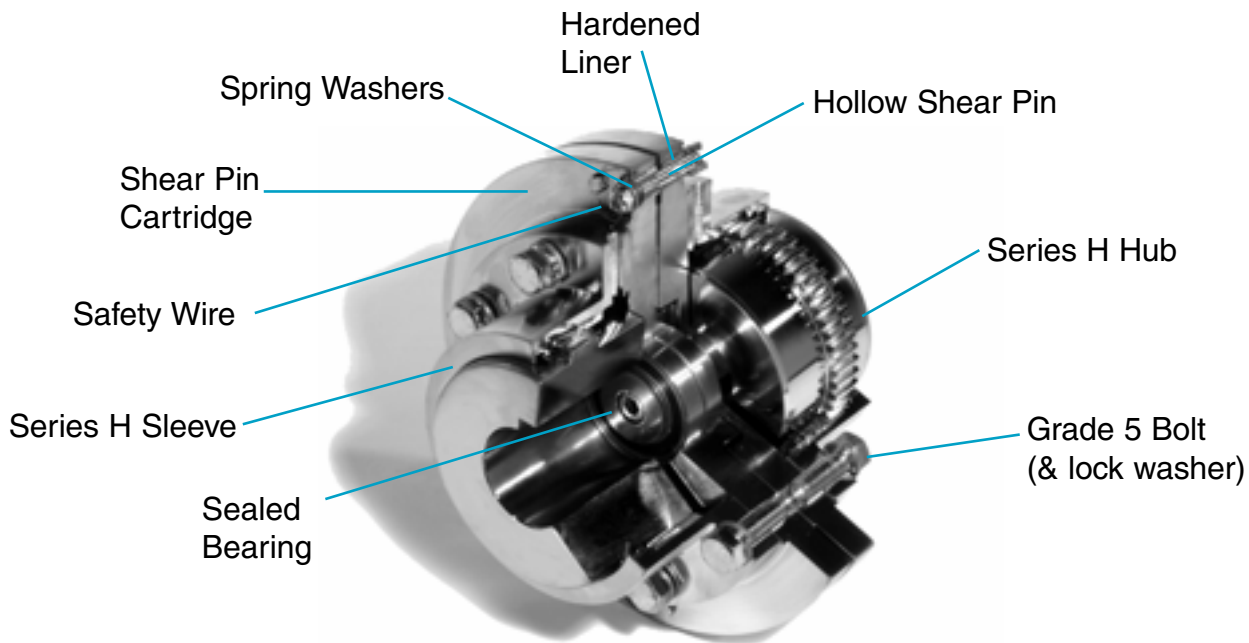


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In today's drive systems, equipment is designed closer to the actual operating conditions to minimize capital cost. It is becoming increasingly important to provide an overload device to protect the equipment from unexpected shock loads. To this end, we have designed a shear cartridge assembly to be mounted between the rolling mill stand or gearbox and the driving equipment.

The Shear Pin Cartridge coupling is a Series H type coupling designed to physically disconnect the driving and driven equipment during torque overload. The purpose of this design is to prevent damage to the equipment - motor, gearbox, pump, etc. - from torque overload. Shear pin couplings are used to limit the peak torque to a predetermined safe value. This value is greater than the normal starting torque of the system.

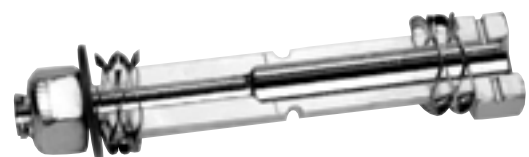
The shear pins shear at the predetermined specified design value which physically separates the driving from the driven half of the coupling. The coupling halves separate then rotate on the sealed radial ball bearings of the shear pin cartridge without transmitting any torque.

The drive can then be shut off, the shear pins replaced, and the operation restarted without disassembling the coupling or moving the driving or the driven equipment. It is designed for quick shear pin replacement to minimize downtime and the associated expense.

The uniqueness of our design is the cartridge and the shear pin. In typical shear pins the shear groove in the pin produces stress risers which under cyclic loading (shear and/or bending) can magnify these stresses to produce a premature fatigue of the pin - even under normal conditions. The result is unexpected pin failure instead of the required overload protection. The unique hollow shear pin design minimizes premature failure from fatigue under normal operation. The hollow shear pin design also makes for a cleaner breaking of the pin which reduces the likelihood of broken pins jamming into the shear flanges and causing damage to the coupling and equipment. These shear pins are made from carbon or alloy steel depending on the torque requirements.

The KOP-FLEX design offers:

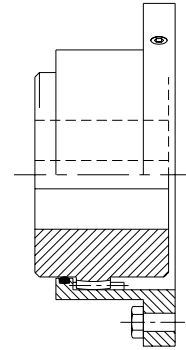
- Increased coupling reliability
- Minimized downtime by enabling quick start-up after shear pin breakage
- Minimized premature shear pin breakage
- Decreased coupling rebuilding cost after shear pin breakage
- Off-the-shelf availability for quick shipment



**Hollow Shear Pin**

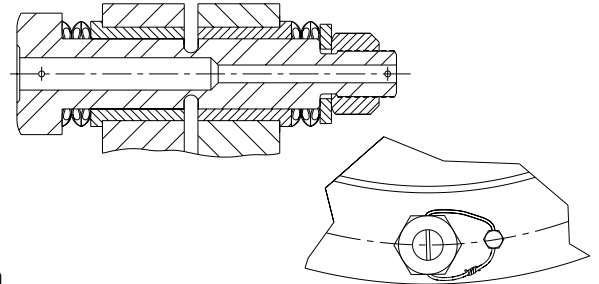
### Standard Series H Flex Half

- O-ring style seal design with exposed bolts
- Axial slide for ease of adjustment during installation and operation
- Curved face gear tooth design for large misalignment capacity
- Readily available from stock or through distributors worldwide
- Interchangeable with existing gear couplings
- Off-the-shelf for quick delivery



### Shear Pin

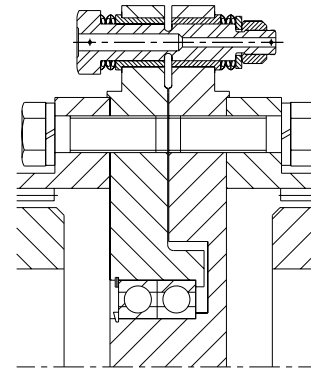
- Hollow shear pin - can be selected for any torque value
- Two pins for standard and up to four pins per coupling for high torque applications - available in incremental torque ranges
- Carbon steel and alloy steel material for various torque capacities
- Unique design of the shear pins minimizes premature failure due to fatigue
- For safety, the shear pins are wired together to prevent them from dislodging from the coupling after shear breakage



### Sealed Radial Ball Bearings

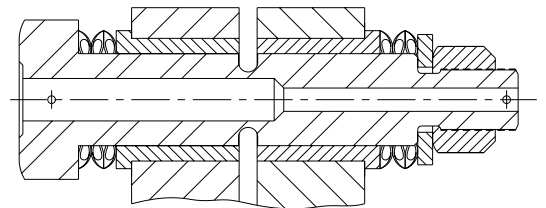
The key to long cartridge life is the ability to rotate freely when disengaged after shearing the pins. We incorporate sealed radial ball bearings rather than bushings to ensure trouble-free operation. Note also that the centrifugal forces present with any rotating equipment can force lubrication to the outside diameters. While the bushing may be lubricated initially, it will become dry after several cycles. Features of our design:

- Ball bearings allow for continuous operation after shear pin breakage
- Sealed bearing - no lubrication required



### Spring-loaded washers and hardened liners

- The bushing holes are line reamed in the cartridge assembly to provide loading on each pin
- Hardened liners (bushings) prevent coupling shear pin hole damage when pins are sheared
- Spring-loaded bevel washers force the pin apart after shearing to prevent the pins from welding and transmitting torque



The Shear Pin cartridge coupling is available in many design options, see pages 184 to 188, for details. The couplings are available in close coupled, spacer design and two different types of floating shaft designs to accommodate almost all shaft separation (distance between shaft end) requirements.



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Values listed are intended only as a general guide, and are typical of usual service requirements. For systems which frequently utilize the peak torque capability of the power source, verify that the magnitude of this peak torque does not exceed the 1.0 Service Factor Rating of the coupling selected. Applications which involve extreme repetitive shock or high-energy load absorption characteristics should be referred — with full particulars — to KOP-FLEX.

Values contained in the table are to be applied to smooth power sources such as electric motors and steam turbines. For drives involving internal combustion engines of four or five cylinders, add 1.0 to the values listed; for six or more cylinders, add 0.5 to the values listed. For systems utilizing AC or DC Mill Motors as the prime mover, refer to Note (1).

**CAUTION** All people moving applications must be referred to engineering.

Application	Typical Service Factor
<b>AGITATORS</b>	
Pure Liquids .....	1.0
Liquids & Solids .....	1.25
Liquids — Variable Density .....	1.25
<b>BLOWERS</b>	
Centrifugal .....	1.0
Lobe .....	1.5
Vane .....	1.25
<b>BRIQUETTE MACHINES</b>	2.0
<b>CAR PULLERS — Intermittent Duty</b> .....	1.5
<b>COMPRESSORS</b>	
Centrifugal .....	1.0
Centriaxial .....	1.25
Lobe .....	1.5
Reciprocating — Multi-Cylinder .....	2.0
<b>CONVEYORS — LIGHT DUTY UNIFORMLY FED</b>	
Apron, Bucket, Chain, Flight, Screw .....	1.25
Assembly, Belt .....	1.0
Oven .....	1.5
<b>CONVEYORS — HEAVY DUTY NOT UNIFORMLY FED</b>	
Apron, Bucket, Chain, Flight, Oven .....	1.5
Assembly, Belt .....	1.25
Reciprocating, Shaker .....	2.5
<b>CRANES AND HOISTS (NOTE 1 and 2)</b>	
Main hoists, Reversing .....	2.5
Skip Hoists, Trolley & Bridge Drives .....	2.0
Slope .....	2.0
<b>CRUSHERS</b>	
Ore, Stone .....	3.0
<b>DREDGES</b>	
Cable Reels .....	1.75
Conveyors .....	1.5
Cutter Head Jig Drives .....	2.5
Maneuvering Winches .....	1.75
Pumps .....	1.75
Screen Drives .....	1.75
Stackers .....	1.75
Utility Winches .....	1.5
<b>ELEVATORS (NOTE 2)</b>	
Bucket .....	1.75
Centrifugal & Gravity Discharge .....	1.5
Escalators .....	1.5
Freight .....	2.5
<b>FANS</b>	
Centrifugal .....	1.0
Cooling Towers .....	1.5
Forced Draft .....	1.5
Induced Draft without Damper Control .....	2.0
<b>FEEDERS</b>	
Apron, Belt, Disc, Screw .....	1.25
Reciprocating .....	2.5

Application	Typical Service Factor
<b>GENERATORS — (Not Welding)</b> .....	1.0
<b>HAMMER MILLS</b> .....	2.0
<b>LAUNDRY WASHERS — Reversing</b> .....	2.0
<b>LAUNDRY TUMBLERS</b> .....	2.0
<b>LINE SHAFT</b> .....	1.5
<b>LUMBER INDUSTRY</b>	
Barkers — Drum Type .....	2.0
Edger Feed .....	2.0
Live Rolls .....	2.0
Log Haul — Incline .....	2.0
Log Haul — Well type .....	2.0
Off Bearing Rolls .....	2.0
Planer Feed Chains .....	1.75
Planer Floor Chains .....	1.75
Planer Tilting Hoist .....	1.75
Slab Conveyor .....	1.5
Sorting Table .....	1.5
Trimmer Feed .....	1.75
<b>MARINE PROPULSION</b>	
Main Drives .....	2.0
<b>MACHINE TOOLS</b>	
Bending Roll .....	2.0
Plate Planer .....	1.5
Punch Press — Gear Driven .....	2.0
Tapping Machines .....	2.5
Other Machine Tools	
Main Drives .....	1.5
Auxiliary Drives .....	1.25
<b>METAL MILLS</b>	
Draw Bench — Carriage .....	2.0
Draw Bench — Main Drive .....	2.0
Forming Machines .....	2.0
Slitters .....	1.5
Table Conveyors	
Non-Reversing .....	2.25
Reversing .....	2.5
Wire Drawing & Flattening Machine .....	2.0
Wire Winding Machine .....	1.75
<b>METAL ROLLING MILLS (NOTE 1)</b>	
Blooming Mills .....	*
Coilers, hot mill .....	2.0
Coilers, cold mill .....	1.25
Cold Mills .....	2.0
Cooling Beds .....	1.75
Door Openers .....	2.0
Draw Benches .....	2.0
Edger Drives .....	1.75
Feed Rolls, Reversing Mills .....	3.5
Furnace Pushers .....	2.5
Hot Mills .....	3.0
Ingot Cars .....	2.5
Kick-outs .....	2.5
Manipulators .....	3.0
Merchant Mills .....	3.0
Piercers .....	3.0
Pusher Rams .....	2.5
Reel Drives .....	1.75
Reel Drums .....	2.0
Reelers .....	3.0
Rod and Bar Mills .....	1.5
Roughing Mill Delivery Table .....	3.0
Runout Tables	
Reversing .....	3.0
Non-Reversing .....	2.0
Saws, hot & cold .....	2.5
Screwdown Drives .....	3.0
Skelp Mills .....	3.0
Slitters .....	3.0
Slabbing Mills .....	3.0
Soaking Pit Cover Drives .....	3.0
Straighteners .....	2.5
Tables, transfer & runout .....	2.0
Thrust Block .....	3.0
Traction Drive .....	3.0
Tube Conveyor Rolls .....	2.5
Unscramblers .....	2.5
Wire Drawing .....	1.5
<b>MILLS, ROTARY TYPE</b>	
Ball .....	2.25
Dryers & Coolers .....	2.0
Hammer .....	1.75
Kilns .....	2.0

Application	Typical Service Factor
Pebble & Rod .....	2.0
Pug .....	1.75
Tumbling Barrels .....	2.0
<b>MIXERS</b>	
Concrete Mixers .....	1.75
Drum Type .....	1.5
<b>OIL INDUSTRY</b>	
Chillers .....	1.25
Paraffin Filter Press .....	1.75
<b>PAPER MILLS</b>	
Barker Auxiliaries, Hydraulic .....	2.0
Barker, Mechanical .....	2.0
Barking Drum Spur Gear Only .....	2.25
Beater & Pulper .....	1.75
Bleacher .....	1.0
Calenders .....	2.0
Chippers .....	2.5
Coaters .....	1.0
Converting Machines, except Cutters, Platers .....	1.5
Couch Roll .....	1.75
Cutters, Platers .....	2.0
Cylinders .....	1.75
Disc Refiners .....	1.75
Dryers .....	1.75
Felt Stretcher .....	1.25
Felt Whipper .....	2.0
Jordans .....	1.75
Line Shaft .....	1.5
Log Haul .....	2.0
Pulp Grinder .....	1.75
Press Roll .....	2.0
Reel .....	1.5
Stock Chests .....	1.5
Suction Roll .....	1.75
Washers & Thickeners .....	1.5
Winders .....	1.5
<b>PRINTING PRESSES</b> .....	1.5
<b>PULLERS — Barge Haul</b> .....	2.0
<b>PUMPS</b>	
Centrifugal .....	1.0
Boiler Feed .....	1.5
Reciprocating	
Single Acting	
1 or 2 Cylinders .....	2.25
3 or more Cylinders .....	1.75
Double Acting .....	2.0
Rotary, Gear, Lobe, Vane .....	1.5
<b>RUBBER INDUSTRY</b>	
Mixer — Banbury .....	2.5
Rubber Calendar .....	2.0
Rubber Mill (2 or more) .....	2.25
Sheeter .....	2.0
Tire Building Machines .....	2.5
Tire & Tube Press Openers .....	1.0
Tubers & Strainers .....	2.0
<b>SCREENS</b>	
Air Washing .....	1.0
Grizzly .....	2.0
Rotary — Stone or Gravel .....	1.5
Traveling Water Intake .....	1.25
Vibrating .....	2.5
<b>SEWAGE DISPOSAL EQUIPMENT</b>	
Bar Screens .....	1.25
Chemical Feeders .....	1.25
Collectors, Circuline or Straightline .....	1.25
Dewatering Screens .....	1.25
Grit Collectors .....	1.25
Scum Breakers .....	1.25
Slow or Rapid Mixers .....	1.25
Sludge Collectors .....	1.25
Thickeners .....	1.25
Vacuum Filters .....	1.25
<b>STEERING GEAR</b> .....	1.0
<b>STOKERS</b> .....	1.0
<b>WINCH</b> .....	1.5
<b>WINDLASS</b> .....	1.75

\* Refer to KOP-FLEX

**NOTES**

- (1) Maximum Torque at the coupling must not exceed Rated Torque of the coupling.
- (2) Check local and industrial safety codes.

#### DATA REQUIRED WITH THE ORDER

1. Size and type from the catalog, see below for selection.
2. Hub bore and keyway or shaft diameter and required tolerance. Specify AGMA standard 9002-A86 or DIN standards as required.
3. Application Power (Hp or kW), Speed (rpm), and type of application.
4. Required Torque Overload or Shear breaking torque for the application.

#### SELECTION GUIDE

- I. Determine the application Power (Hp or kW), Operating Speed (RPM), type of application, hub bore or shaft diameter.
- II. Select the appropriate Service Factor (S.F.) from table on page 182, if the equipment is not listed consult KOP-FLEX.
- III. Calculate application torque:  

$$\text{Torque (lb-in.)} = \frac{\text{Hp} \times 63025 \times \text{S.F.}}{\text{RPM}}$$

OR

$$\text{Torque (N-m)} = \frac{\text{kW} \times 9549 \times \text{S.F.}}{\text{RPM}}$$
- IV. Select the type of coupling required from the pages 184 through 188.
- V. Select the coupling size from pages 184 through 188. The coupling torque rating must be greater than the calculated torque from Section III above.
- VI. Verify the maximum speed rated for the coupling per pages 184 to 188 meets the requirement of the application. For high speed applications which may require balancing contact KOP-FLEX.
- VII. Verify the coupling maximum bore capacity exceeds the application bore requirement. If the coupling maximum bore capacity is less than the required bore, select the appropriate coupling size based on data from the catalog pages 184 through 188.
- VIII. Based on the application determine the torque overload release value. Specify this value at the time of order. For any questions consult KOP-FLEX.
- IX. If application is other than Close Coupled, determine the distance between shaft ends (shaft separation or DBSE) and check the minimum "C" dimension on pages 185 through 187.

#### EXAMPLE:

Application: Motor to Gearbox with a 1.5 Service Factor requirement

Operating Power: 550 Hp (738 kW)

Operating Speed: 800 rpm

Shaft Size: 4.72 inches (120 mm) diameter

#### Selection for Example:

I. 550 Hp (738 kW) @ 800 rpm

II. S.F. = 1.5

III. Torque =  $\frac{550 \times 63025 \times 1.5}{800} = 64,995 \text{ lb-in.}$

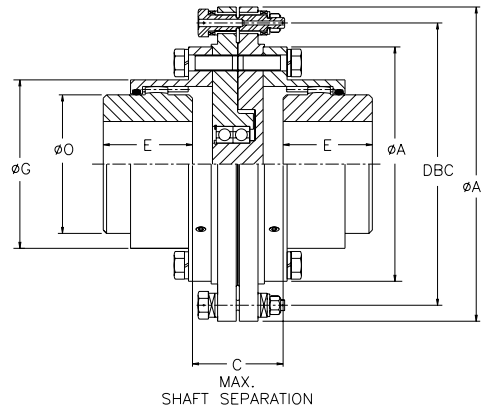
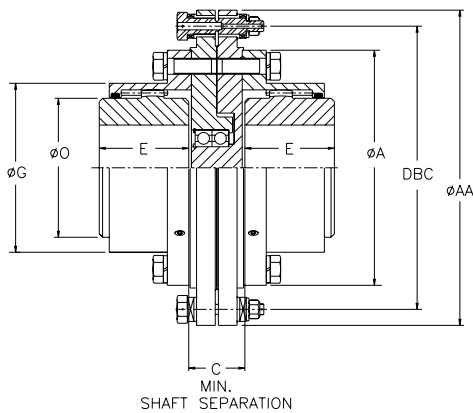
or 7343 N-m.

- IV. Required application is for type HSP (Close Coupled).
- V. Selection based on torque is #3 HSP from pages 184-185 of this catalog.
- VI. Coupling meets the speed requirement of 800 rpm (Coupling rating for #3HSP is 3250 rpm).
- VII. Bore required is 4.72 inches (120 mm) minimum. #3 HSP maximum bore capacity is 4.38 inches (111 mm) which is less than the required bore. Select size #3.5 HSP instead, this meets bore, torque and speed requirements of pages 184-185.
- VIII. Shear or Overload torque - select a specific value based on application. For size #3.5 HSP shear torque range can be 23,400 - 222,000 lb-in. (2640 - 25100 N-m).
- IX. No shaft length or DBSE required since this application calls for a close coupled coupling.



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### Close-Coupled Coupling Arrangement



#### Coupling Greases

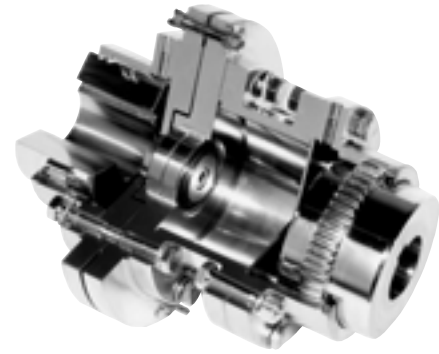
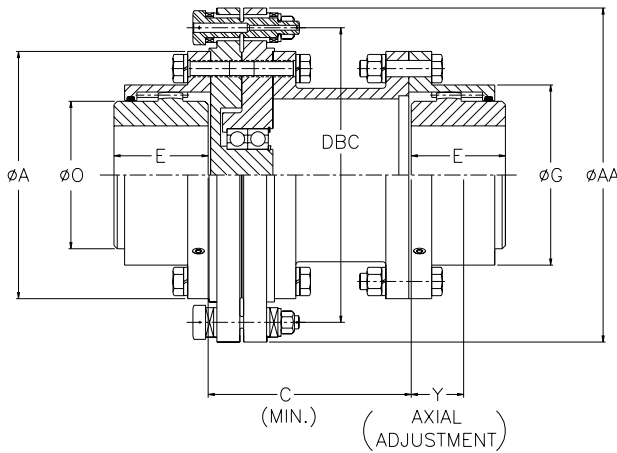
KOP-FLEX offers greases specifically designed for use in coupling applications. For proper lubrication and long service life, use KSG Standard Coupling Grease, or KHP High Performance Coupling Grease. See pages 204-206 for detailed specifications.

Series H close coupled cartridge arrangement is used in typical torque overload limit applications where the distance between shaft ends is not great. This design allows the shear pins to be replaced easily in the field without the need to move the equipment or change alignment. The cartridge with the pilots is designed to reduce the forces due to unbalance during normal operations and after shearing of the pins due to overload torque. The sealed bearing in the cartridge is designed to operate at the speeds shown in the catalog.

The Series H hollow shear pins are precision machined from carbon or alloy steel depending on the shear torque value required for the application. The maximum and the minimum shear torque value is shown in the table below. The actual shear value can be predetermined and selected based on the requirements of the application. The gear coupling itself is the standard series H coupling that is available off-the-shelf from our plant or from our distributors throughout the world. Series H is the mainstay of the steel and pulp & paper mill industry with its O-ring seal design, large bore capacity and standard flange configuration.

CPLG Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Torque Rating (1) (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed (2) RPM	Coupling Dimensions (inches)						
					Min.	Max.		A	AA	C	DBC	E <sub>R</sub>	G <sub>R</sub>	Y
										Min.				
1 1/2	2 1/4	2 3/8	5/8 x 7/32	17000	4160	25500	2700	6	8 1/4	6 5/8	7 1/4	1 15/16	3 13/16	3/8
2	2 7/8	3	3/4 x 1/4	31500	6330	47250	2400	7	9 1/4	7 5/8	8 1/4	2 7/16	4 13/16	7/8
2 1/2	3 1/2	3 3/4	7/8 x 5/16	56700	8060	85100	2200	8 3/8	10 5/8	8 15/16	9 5/8	3	5 3/4	9/16
3	4	4 3/8	1 x 3/8	101000	19940	152000	2100	9 7/16	12 3/4	10 9/16	11 1/4	3 19/32	6 3/4	1 7/16
3 1/2	4 5/8	5	1 1/4 x 7/16	148000	23400	222000	2100	11	14 3/4	12 1/8	13 1/4	4 3/16	7 3/4	1 5/8
4	5 1/2	6 1/8	1 1/2 x 1/2	236000	35600	338000	2000	12 1/2	16 1/2	13 1/2	14 3/4	4 3/4	9	2
4 1/2	6 1/4	6 7/8	1 3/4 x 1/2	318000	40500	477000	1800	13 5/8	18 1/2	15 1/4	16	5 5/16	10 1/8	2 1/4
5	7 1/8	7 3/8	1 3/4 x 1/2	441000	107900	662000	1700	15 5/16	21 1/4	16 11/16	18 1/4	6 1/32	11 3/8	3 5/16
5 1/2	8	8 1/4	2 x 1/2	580000	116400	870000	1600	16 3/4	22 11/16	18 7/16	19 11/16	6 29/32	10 3/4	3 9/16
6	8 7/8	9 1/4	2 1/2 x 5/8	759000	124800	1140000	1500	18	23 15/16	19 7/16	20 15/16	7 13/32	11 1/2	4 1/16
7	10 3/8	10 3/4	2 1/2 x 3/4	1160000	209000	1674000	1400	20 3/4	27	21 5/8	24	8 11/16	13 3/8	4 5/64

NOTE: 1. PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.  
2. FOR HIGH SPEED APPLICATION CONSULT KOP-FLEX FOR BALANCE REQUIREMENTS.



The spacer design is for unique applications that require torque overload safety but have shaft separation greater than the standard close coupled configuration, and shorter than the minimum distance between shaft ends (shaft separation) required by the floating shaft design (Series HSPF – page 186). The spacer design can accommodate various shaft separations and provide for a lighter weight design than the Series HSPF - floating shaft. The other advantage of the HSPS (spacer type) is its low weight and lower number of components than

the HSPF or HSPX types. The flex hubs are mounted on the equipment with the spacer and the shear pin cartridge assembly making up the required shaft separation. The shear pin cartridge unit is identical to the HSP (close coupled) or the HSPF (floating shaft) configuration. The hollow shear pins can be customized for any required shear or torque overload and offer the advantage and ease of field replaceability. The gear couplings are the standard Series H type couplings.

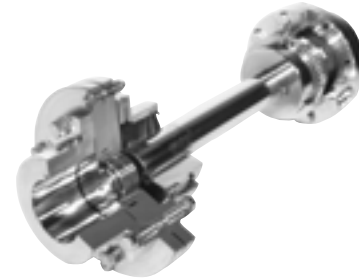
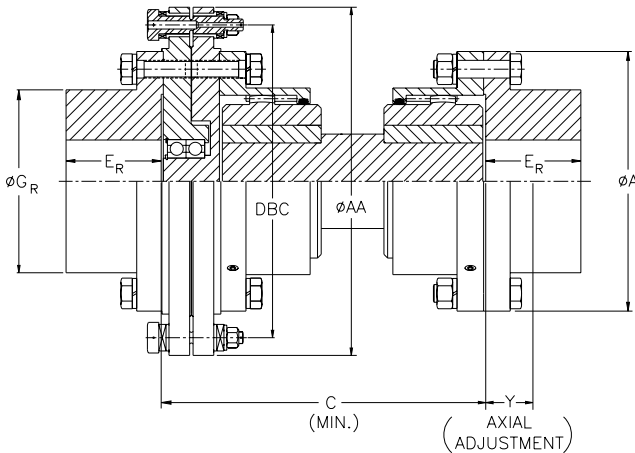
CPLG Size	Maximum Bore with Standard Keyway	Maximum Bore with Reduced Depth Keyway	Reduced Depth Keyway	Torque Rating (1) (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed (2) RPM	Coupling Dimensions (inches)							
					Min.	Max.		A	AA	C	DBC	E	G	O	Y
										Min.					
1 1/2	2 1/4	2 3/8	5/8 x 7/32	17000	4160	25500	3800	6	8 1/4	5.38	7 1/4	1 15/16	3 15/16	3 1/8	1/32
2	2 7/8	3	3/4 x 1/4	31500	6330	47250	3300	7	9 1/4	6.00	8 1/4	2 7/16	4 15/16	4	7/8
2 1/2	3 1/2	3 3/4	7/8 x 5/16	56700	8060	85100	2900	8 3/8	10 5/8	6.88	9 5/8	3	5 7/8	4 7/8	9/16
3	4	4 3/8	1 x 3/8	101000	19940	152000	2700	9 7/16	12 3/4	7.75	11 1/4	3 19/32	6 7/8	5 5/8	1 7/16
3 1/2	4 5/8	5	1 1/4 x 7/16	148000	23400	222000	2500	11	14 3/4	9.00	13 1/4	4 3/16	7.91	6.50	1 5/8
4	5 1/2	6 1/8	1 1/2 x 1/2	236000	35600	338000	2300	12 1/2	16 1/2	9.00	14 3/4	4 3/4	9 1/4	7 3/4	2.
4 1/2	6 1/4	6 7/8	1 3/4 x 1/2	318000	40500	477000	2100	13 5/8	18 1/2	9.00	16	5 5/16	10 3/8	8 1/2	2 1/4
5	7 1/8	7 3/8	1 3/4 x 1/2	441000	107900	662000	1800	15 5/16	21 1/4	11.50	18 1/4	6 1/32	11 9/16	9 1/2	3 5/16
5 1/2	8	8 1/4	2 x 1/2	580000	116400	870000	1700	16 3/4	22 11/16	9.75	19 11/16	6 29/32	12 11/16	10 1/2	3 9/16
6	8 7/8	9 1/4	2 1/2 x 5/8	759000	124800	1140000	1600	18	23 15/16	10.00	20 15/16	7 13/32	13 7/8	11 1/2	4 1/16
7	10 3/8	10 3/4	2 1/2 x 3/4	1160000	209000	1674000	1450	20 3/4	27	11.00	24	8 11/16	16 1/16	13 1/2	4 7/8

NOTE: 1. PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATION.  
NOTE: 2. FOR SPEEDS ABOVE THOSE LISTED OR SHAFT SEPARATIONS GREATER THAN 24 INCHES CONSULT KOP-FLEX.



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### Close Coupled With Floating Shaft Coupling Arrangement



The floating shaft design offers the unique advantage and ease of replaceability of the coupling without moving the equipment. This design can be customized for any shaft separation your application may require. The Rigid Hubs are mounted on the equipment with the flex half mounted on the center shaft with the standard cartridge design shear pin configuration. With the Rigids mounted outboard or on the equipment, the coupling bolts can

be removed and thus drop the center assembly with the flex halves and the shaft for ease of maintenance and repair. As in the other type of Series H shear pin couplings, the shear pins can be easily changed by maintenance personnel without having to move the equipment. The design and configuration of the hollow shear pin is the same as the other ones - Series HSP, HSPS and HSPX.

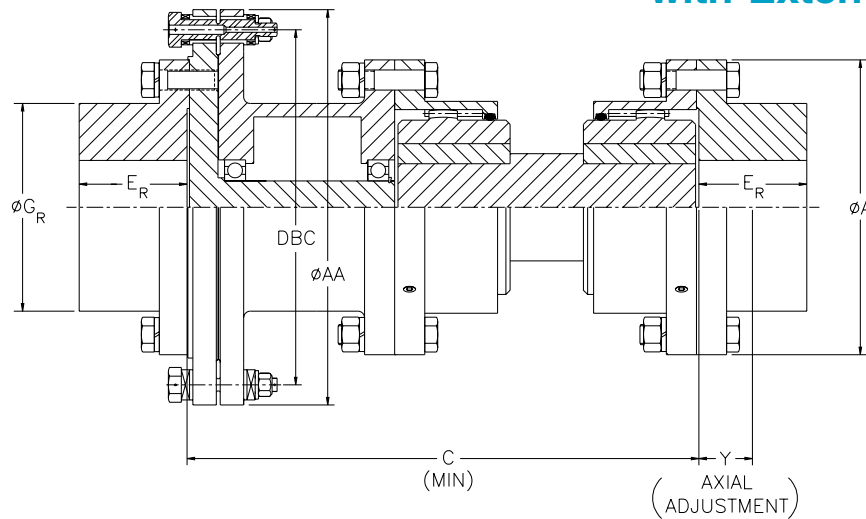
CPLG Size	Maximum Bore with Standard Key	Torque Rating (1) (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed (2) RPM	Coupling Dimensions (inches)						
			Min.	Max.		A	AA	C	DBC	$E_R$	$G_R$	Y
								Min.				
1 1/2	2 1/4	17000	4160	25500	2700	6	8 1/4	6 5/8	7 1/4	1 15/16	3 13/16	3/8
2	3 1/2	31500	6330	47250	2400	7	9 1/4	7 5/8	8 1/4	2 7/16	4 13/16	7/8
2 1/2	4 1/4	56700	8060	85100	2200	8 3/8	10 5/8	8 15/16	9 5/8	3	5 3/4	9/16
3	4	101000	19940	152000	2100	9 7/16	12 3/4	10 9/16	11 1/4	3 19/32	6 3/4	1 7/16
3 1/2	4 5/8	148000	23400	222000	2100	11	14 3/4	12 1/8	13 1/4	4 3/16	7 3/4	1 5/8
4	5 1/2	236000	35600	338000	2000	12 1/2	16 1/2	13 1/2	14 3/4	4 3/4	9	2
4 1/2	6 1/4	318000	40500	477000	1800	13 5/8	18 1/2	15 1/4	16	5 5/16	10 1/8	2 1/4
5	9	441000	107900	662000	1700	15 5/16	21 1/4	16 11/16	18 1/4	6 1/32	11 3/8	3 5/16
5 1/2	8 1/2	580000	116400	870000	1600	16 3/4	22 11/16	18 7/16	19 11/16	6 29/32	10 3/4	3 9/16
6	9 1/4	759000	124800	1140000	1500	18	23 15/16	19 7/16	20 15/16	7 13/32	11 1/2	4 1/16
7	10 3/8	1160000	209000	1674000	1400	20 3/4	27	21 5/8	24	8 11/16	13 3/8	4 5/64

NOTE: 1. PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATION.

NOTE: 2. FOR SPEEDS ABOVE THOSE LISTED OR SHAFT SEPARATIONS GREATER THAN 42 INCHES CONSULT KOP-FLEX.



### Floating-Shaft Coupling Arrangement with Extended Bearing



The design concept for the floating shaft with an extended bearing is similar to the HSPF design except the bearing is extended for a longer support area. In some applications it is necessary for the bearings to be separated over a distance to allow for smooth operation. The separated bearings are designed to better resist the moments and forces generated from misalignment,

unbalance and other external forces. These issues are typical of applications with very long shaft separation and high speed operation. The extended bearing design offers an advantage over the standard design which allows it to support large weight hence a longer floating shaft separation.

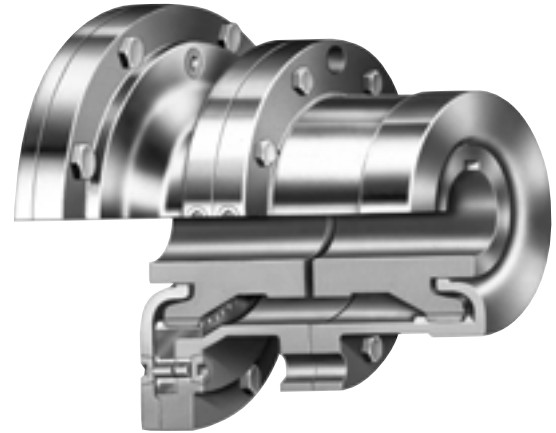
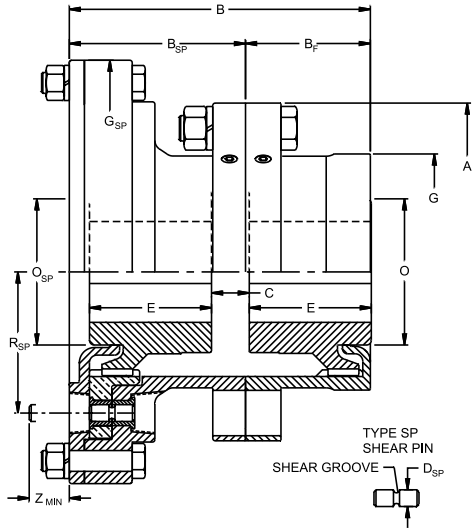
CPLG Size	Maximum Bore with Standard Key	Torque Rating (1) (lb.-in.)	Shear Torque Range (lb.-in.)		Maximum Speed (2) RPM	Coupling Dimensions (inches)						
			Min.	Max.		A	AA	C	DBC	$E_R$	$G_R$	Y
								Min.				
1 1/2	2 1/4	17000	4160	25500	2700	6	8 1/4	11 1/8	7 1/4	1 15/16	3 13/16	3/8
2	3 1/2	31500	6330	47250	2400	7	9 1/4	12 1/8	8 1/4	2 7/16	4 13/16	7/8
2 1/2	4 1/4	56700	8060	85100	2200	8 3/8	10 5/8	13 7/16	9 5/8	3	5 3/4	9/16
3	4	101000	19940	152000	2100	9 7/16	12 3/4	15 13/16	11 1/4	3 19/32	6 3/4	1 7/16
3 1/2	4 5/8	148000	23400	222000	2100	11	14 3/4	17 31/64	13 1/4	4 3/16	7 3/4	1 5/8
4	5 1/2	236000	35600	338000	2000	12 1/2	16 1/2	18 3/4	14 3/4	4 3/4	9	2
4 1/2	6 1/4	318000	40500	477000	1800	13 5/8	18 1/2	20 1/2	16	5 5/16	10 1/8	2 1/4
5	9	441000	107900	662000	1700	15 5/16	21 1/4	25 7/16	18 1/4	6 1/32	11 3/8	3 5/16
5 1/2	8 1/2	580000	116400	870000	1600	16 3/4	22 11/16	27 3/16	19 11/16	6 29/32	10 3/4	3 9/16
6	9 1/4	759000	124800	1140000	1500	18	23 15/16	27 15/16	20 15/16	7 13/32	11 1/2	4 1/16
7	10 3/8	1160000	209000	1674000	1400	20 3/4	27	31 1/8	24	8 11/16	13 3/8	4 5/64

NOTE: 1. PEAK RATING IS 2X NORMAL TORQUE RATING. CONSULT KOP-FLEX FOR HIGH TORQUE APPLICATIONS.

NOTE: 2. FOR SPEEDS ABOVE THOSE LISTED OR SHAFT SEPARATIONS GREATER THAN 42 INCHES CONSULT KOP-FLEX



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FAST'S® Shear Pin couplings are used to limit the transmission of torque to a predetermined safe value which must be greater than normal maximum system starting torque. For a period after the pins shear, the bronze gear ring can continue to rotate with its mating hub as it is completely immersed in the annulus of lubricant. Two pairs of hardened and ground bushings are fitted into the gear ring and shear pin sleeve flange. If the desired release torque permits, only one shear pin is used.

FAST'S® Shear Pins are precision-machined from special heat-treated aluminum or steel alloys. Application permitting, these are selected to have their yield point approach the ultimate strength to minimize pin fatigue on start-stop operations. Any specified torque limit must allow for the normal starting torque characteristics of the motor or other prime mover. It cannot exceed the peak rating of coupling. Shear torque must be at least 2

times the application peak torque (starting loads, shock loads, etc.). All pins must be necked at least 10 percent and no more than 80 percent of body diameter  $D_{SP}$ . The recommended release torque for motor drives is from 1 1/2 to 3 times the motor starting torque.

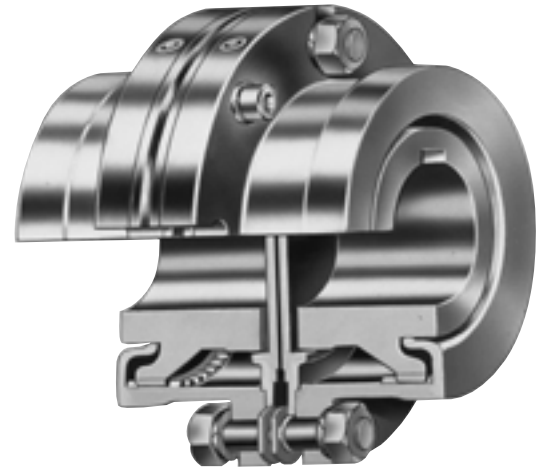
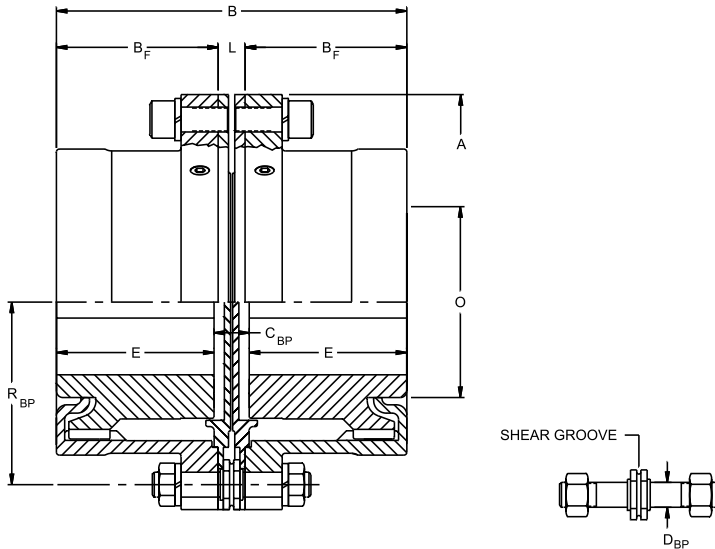
FAST'S® Shear Pin couplings are used for higher speed and lower torque requirements than are possible with the Breaking Pin type. They are suited for protecting driving equipment against an infrequent shock load such as a jammed mill condition. The FAST'S® Shear Pin half can be combined with a rigid hub or other half-couplings such as Insulated, Slide, etc. It is used in floating shaft arrangements and spacer couplings, but Shear Shafts and Shear Spacers may be more economical if attaining the release torque value appears unlikely.

FAST'S® Shear Pin couplings should be installed with the shear pin half-coupling mounted on the driving shaft, so its flex hub will be the "running hub" after the pin shears.

CPLG Size	Max. Bore with Standard Key	Torque Rating (lb.-in.)	Shear Torque Range (lb.-in.)		Max. Speed (2) RPM	Coupling Dimensions (inches)											
			Min.ⓐ	Max.ⓐ		A	B	BF	$B_{SP}$	C	$D_{SP}$ ®	E	G	$G_{SP}$	O	$O_{SP}$	$R_{SP}$
										Min.							
1 1/2	2 1/4	17000	620	14900	6100	6	5 11/32	2 3/32	3 1/4	1	1/4	1 15/16	3 15/16	7 9/16	2 3/16	2 3/16	2 13/32
2	3 1/2	31500	760	32700	4800	7	6 7/32	2 19/32	3 5/8	5/64	1/4	2 7/16	4 15/16	8 5/8	2 7/8	2 7/8	2 15/16
2 1/2	4 1/4	56700	900	69000	4100	8 3/8	7 9/16	3 7/32	4 11/32	15/16	3/8	3 1/32	5 7/8	10 1/2	3 5/8	3 5/8	3 1/2
3	4	101000	1050	102000	3300	9 7/16	7 15/16	3 27/32	4 3/32	1/64	3/8	3 19/32	6 7/8	11 1/2	4 1/4	4 1/4	4 1/16
3 1/2	4 5/8	148000	1230	119000	2800	11	9 1/8	4 7/16	4 11/16	1/4	3/8	4 3/16	7 29/32	13 1/8	5	5	4 3/4
4	5 1/2	236000	1420	245000	2500	12 1/2	10 3/8	5 1/16	5 5/16	1/4	1/2	4 3/4	9 1/4	14 5/8	5 3/4	5 3/4	5 1/2
4 1/2	6 1/4	318000	1550	395000	2200	13 5/8	11 11/16	5 11/16	6	5/16	5/8	5 5/16	10 3/8	16 1/4	6 1/2	6 1/2	6
5	9	441000	1750	470000	2000	15 5/16	12 15/16	6 5/16	6 5/8	5/16	5/8	6 1/32	11 9/16	18	7 5/16	7 5/16	6 3/4
5 1/2	8 1/2	580000	8420	645000	1800	16 3/4	14 3/8	6 15/16	7 7/16	5/16	3/4	6 29/32	12 7/8	21 1/2	8	7 1/2	7 15/16
6	9 1/4	759000	10900	850000	1650	18	15 11/16	7 7/16	8 7/16	5/16	13/16	7 13/32	13 7/8	23 1/4	8 13/16	8 5/16	8 3/4
7	10 3/8	1160000	18400	1345000	1450	20 3/4	18 1/4	8 11/16	9 9/16	3/8	1	8 11/16	16 1/4	25 3/4	10 5/16	10 1/8	9 3/4

NOTE: PEAK RATING IS 2X NORMAL TORQUE RATING.

- Exposed bolts are standard for all sizes.
- ⓐ Using 2 shear pins of special alloy steel.
- ⓑ Using 1 shear pin. In sizes #1 1/2 - #5 a special aluminum alloy is used for low torque release values.
- ⓒ All pins must be necked at least 10 percent and no more than 80 percent of the shear pin diameter. Diameter reduction to less than 1/8 inch is not recommended.



Two standard FAST'S® flex-halves are modified at the center flange with four U-slots. Standard center flange bolt holes are omitted. When the lubricant retaining plate is capscrewed to each flange, a projecting support ring prevents that end of the sleeve from dropping due to its weight which would damage the mating gear teeth.

Each of the four breaking pins has shoulders which seat into C-slots in the end plates that are milled concentric with the U-slots, and lock the pin in place when the retaining nuts are tightened. Two flats on each pin accommodate an open-end wrench. This feature permits tightening each end of a breaking pin without preloading the necked section.

Application parameters are the same as for FAST'S® Shear Pins. Light loads cannot be protected as four pins

share the torque. Speed limits are lower. The FAST'S® Breaking Pin design is preferred for frequent starting, for reversing drives, and for transmitting normal cyclic peak loads. Shear torque must be at least 2 times the application peak torque (starting loads, shock loads, etc.). Condition of the pins can be readily determined by visual inspection.

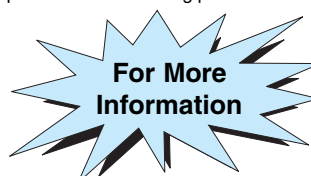
Type FBP has two Type FAST'S® hubs for connecting straight shaft ends. If one shaft is tapered with a locknut, use a Mill Motor type coupling.

FAST'S® Breaking Pin flex-rigid couplings are unique as the two half-couplings must remain piloted after the pins break.

CPLG Size	Max. Bore with Standard Key	Torque Rating (lb.-in.)	Shear Torque Range (lb.-in.)		Max. Speed (2) RPM	Coupling Dimensions (inches)									
			Min.	Max.		A	B	BF	C <sub>SP</sub>	D <sub>BP</sub> ⊙	E	L	O	O <sub>SP</sub>	R <sub>SP</sub>
1 1/2	2 1/4	17000	7080	14900	4000	6	5 11/32	2 3/32	13/16	3/8	1 15/16	11/16	2 3/16	2 3/16	2 13/32
2	3 1/2	31500	8640	35200	3100	7	6 7/32	2 19/32	13/16	1/2	2 7/16	11/16	2 7/8	2 7/8	2 15/16
2 1/2	4 1/4	56700	10300	69000	2650	8 3/8	7 9/16	3 7/32	15/16	5/8	3 1/32	3/4	3 5/8	3 5/8	3 9/16
3	4	101000	12000	119000	2250	9 7/16	7 15/16	3 27/32	1	5/8	3 19/32	13/16	4 1/4	4 1/4	4 1/16
3 1/2	4 5/8	148000	17100	189000	2000	11	9 1/8	4 7/16	1 1/16	3/4	4 3/16	13/16	5	5	4 3/4
4	5 1/2	236000	20200	285000	1750	12 1/2	10 3/8	5 1/16	1 1/16	3/4	4 3/4	13/16	5 3/4	5 3/4	5 1/2
4 1/2	6 1/4	318000	21500	395000	1600	13 5/8	11 11/16	5 11/16	1 1/4	3/4	5 5/16	15/16	6 1/2	6 1/2	6
5	9	441000	28300	552000	1450	15 5/16	12 15/16	6 5/16	1 7/16	7/8	6 1/32	1 1/8	7 5/16	7 5/16	6 3/4
5 1/2	8 1/2	580000	41900	732000	1300	16 3/4	14 3/8	6 15/16	1 9/16	7/8	6 29/32	1 1/4	8	7 1/2	7 1/4
6	9 1/4	759000	45500	952000	1200	18	15 11/16	7 7/16	1 5/8	7/8	7 13/32	1 5/16	8 13/16	8 5/16	7 7/8
7	10 3/8	1160000	68800	1515000	1000	20 3/4	18 1/4	8 11/16	1 3/4	1	8 11/16	1 3/8	10 5/16	10 1/8	9 1/8

NOTE: PEAK RATING IS 2X NORMAL TORQUE RATING.

- Exposed bolts are standard. Outer end of flex hub extends beyond end of sleeve in sizes #5 1/2 - #7.
- ⊙ All pins must be necked at least 10 percent and no more than 80 percent of the breaking pin diameter. Diameter reduction to less than 1/8 inch is not recommended.



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# HIGH PERFORMANCE COUPLINGS

## KOP-FLEX®

**HIGH PERFORMANCE DISC COUPLINGS...**

**Available In Four Standard Styles...**

**Designed And Manufactured To Meet API 671 As Standard**

These couplings are engineered to accommodate a broad range of demanding operating conditions: boiler feed pumps, centrifugal and axial compressors, generator sets, test stands, gas and steam turbines, marine drives, etc.

The HP disc coupling is the preferred choice for demanding turbomachinery applications. Superior quality and a wide variety of standard and custom designs backed by unsurpassed engineering expertise make KOP-FLEX the industry leader.

- Inherent fail-safe designs
- KOPLON\* coated flexible disc elements for maximum life
- Factory assembled
- Greatest reduced moment available
- Dynamically balanced

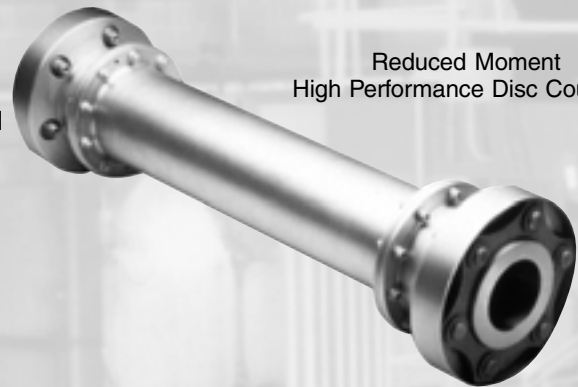
### High Performance Flexible Diaphragm Couplings

The patented Flexible Diaphragm Coupling from KOP-FLEX® brand couplings transmits torque from the driving shaft via a rigid hub, then through a flexible diaphragm to a spacer. The diaphragm deforms while transmitting this torque to accommodate misalignment. The spacer in turn drives matching components attached to the driven equipment. Outstanding design features include:

- Field-replaceable Stockable Diaphragms
- Specially-Contoured One-Piece Diaphragm Design
- Patented Diaphragm Shape
- Piloted Fits
- Diaphragms are 15.5 PH Shot-Peened Stainless Steel
- Inherently Low Windage Design
- Conforms To API 671 Specifications

### High Performance Gear Couplings

- Thousands in Service
- Choose From Straight or Crowned Nitrided Gear Teeth, Depending on your Application
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- Heat-treated Alloy Components



Reduced Moment  
High Performance Disc Coupling



Size #5.5 MDM-J  
diaphragm coupling



Size #6 Gear Coupling  
G.E. MS5001 Gas Turbine Driven  
Compressor Train

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