

THE BEARING SOLUTION



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BEARING CO., INC.



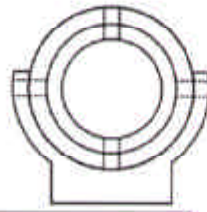
FRICTIONLESS, LOW HYSTERESIS BEARING FOR ANGULAR APPLICATIONS

- Low Hysteresis • Backlash Free • No Noise • Stainless Steel • Frictionless •
- Self Centering • Repeatability • Long Life • No Maintenance • Vacuum Applications • Compact •
- No Lubrication • Detrimental Environments • Simple Installation • Custom Design •

TYPICAL APPLICATIONS

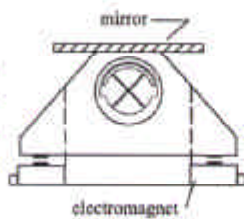
Gimbals

Free from backlash, friction and wear. C-Flex bearings give the extreme accuracy needed for positioning precision optics.



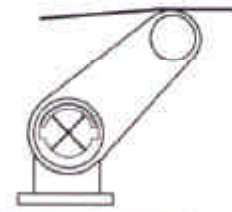
Oscillating Mirrors

Optical scanners using C-Flex bearings, provide for the ultimate in cost effective design. They allow for easy assembly and, with indefinite life expectancies, perform with undiminished accuracy.



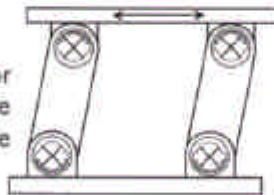
Tensioners

Belt or chain tensioning can be easily achieved through the use of C-Flex bearings. Tolerant of hostile environments and not subject to wear, extreme long life can be expected without maintenance.



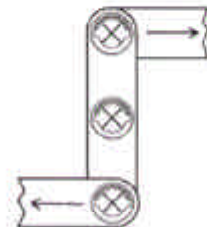
Linear Positioners

Free of errors due to backlash, friction or wear, C-Flex bearings mounted in suitable geometric structures can provide accurate linear movement or adjustment.



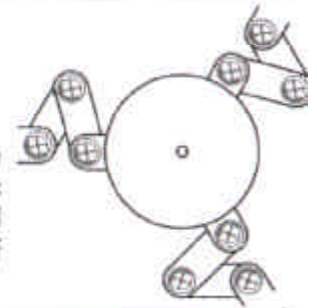
Lever Actuators

Accurate motion requirements in areas of contamination, temperature extremes, or in a vacuum, can be easily provided through linkages utilizing C-Flex bearings. Used in dynamic conditions, the precision of load sensitive systems can be increased to a much higher level than with ball bearings.



Restrained or Dampened Oscillating Motion

Eccentric or circular oscillating mechanisms can utilize C-Flex bearings to provide centralizing and dampening actions for a lifetime of maintenance free performance.



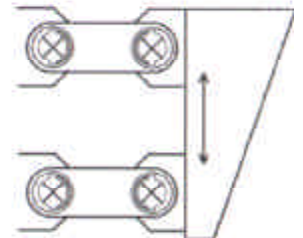
Gauges Sensors

Miniature sizes which are free of error from backlash, friction or wear make C-Flex bearings ideal for applications where position must be accurately measured or outside forces sensed.



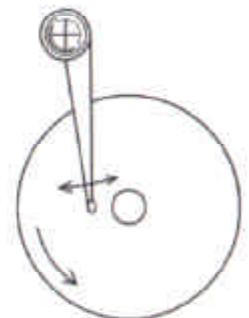
Vibrating/Sorting Mechanisms

A workhorse, capable of supporting heavy loads for years of continuous service without wear or deterioration, C-Flex bearings are ideal for equipment such as vibrating hoppers operating in severe environments.



Optical or Magnetic Disc Read/Write Heads

With their constant predictable spring rate, C-Flex bearings are immune to the problems of starting vs. moving torque requirements of conventional bearings. Also since they operate without backlash errors or wear, a lifetime of accurate performance can be expected.



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The C-Flex bearing or "pivot" is a cylindrical, limited rotational bearing, with a high relative radial and axial stiffness which is available in low, medium, or high torsional spring rates. It is typically available for maximum deflection angles of +/- 30°, but various configurations are supplied upon request. Torsional stiffness ranges from .0003 Lb-In/degree to 7.8023 Lb-In/degree. It can be used simply as an oscillating unit or an extremely sensitive critical element.

The advantages of cross-flexure bearings has been well documented in connection with the replacing of ball bearing pivots in optomechanical applications. One such application in which the C-Flex bearing has outperformed alternatives is the scanning mirror assembly of a mass spectrometer. Here two mirrors are mounted on an assembly and laser beams are scanned across the samples to be analyzed. The lubrication free, frictionless movement of the C-Flex bearings is ideal in applications such as this where the outgassing from bearing lubricants could contaminate the optics, and bearing wear due to continuous limited rotation would eventually result in movement errors.

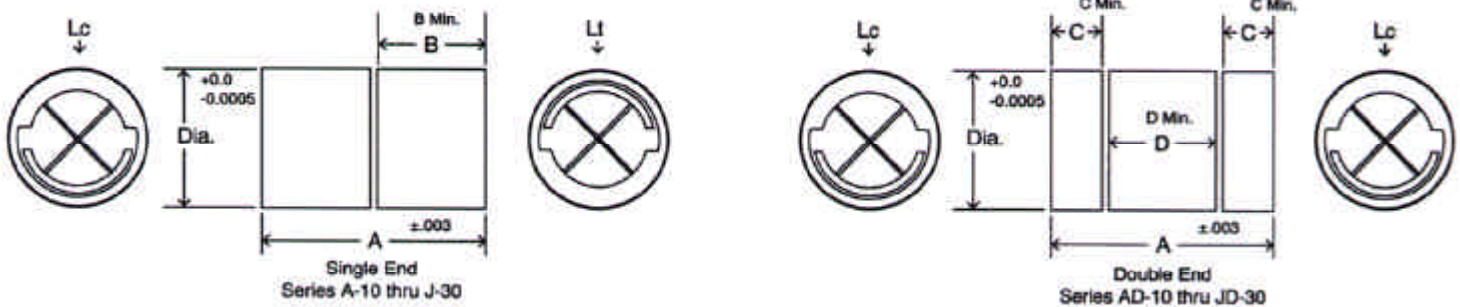
The bearing itself consists of two stainless steel sleeves held in position by three leaf springs on two planes. There is no contact between the sleeves - eliminating friction, and the springs also provide the pivotal action which is inherently self centering and requires no lubrication or maintenance. The bearing is also available with an additional sleeve allowing for central mounting providing two pivotal arms (the double end bearing, sizes AD to JD).

Other applications include those requiring accuracy without backlash, friction and wear such as gimbals or within gauge sensors where position must be accurately measured or outside forces sensed. Workhorse applications requiring the support of heavy loads for years of continuous service including mechanisms such as vibrating hoppers. Lever actuators and tensioners can also benefit from the use of these bearings. Optical/magnetic read/write heads also gain from the constant predictable spring rate-immune to the problems of starting vs. moving torque.

Free from backlash, friction and wear, the C-Flex bearing could provide the ultimate in cost effective design, allowing for easy assembly and indefinite life expectancies with undiminished accuracy. Selection of the correct bearing for the application loads expected should result in exceptional long life, even within the most arduous environment.

Custom designs for greater angular travel (+/- 50°), heavy loads (> 1600lb), special materials (eg. Hast X) or high volume/low cost can be provided.

C-Flex Bearings Size and Performance Properties

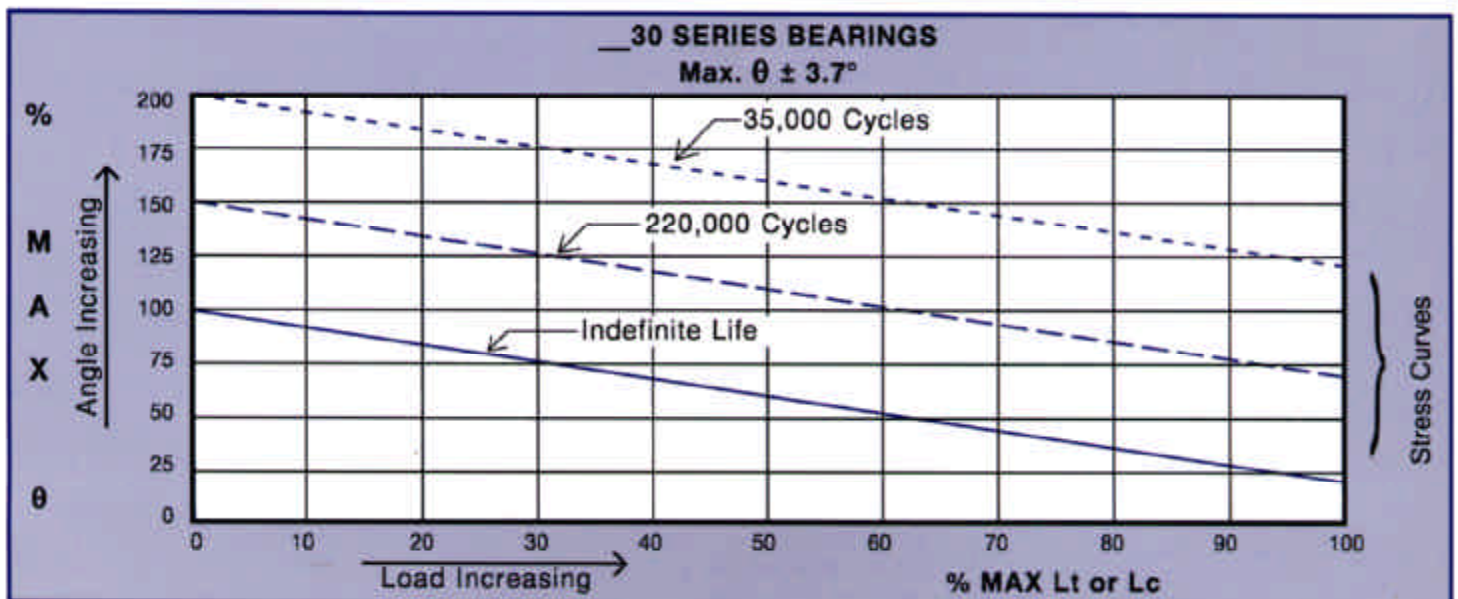
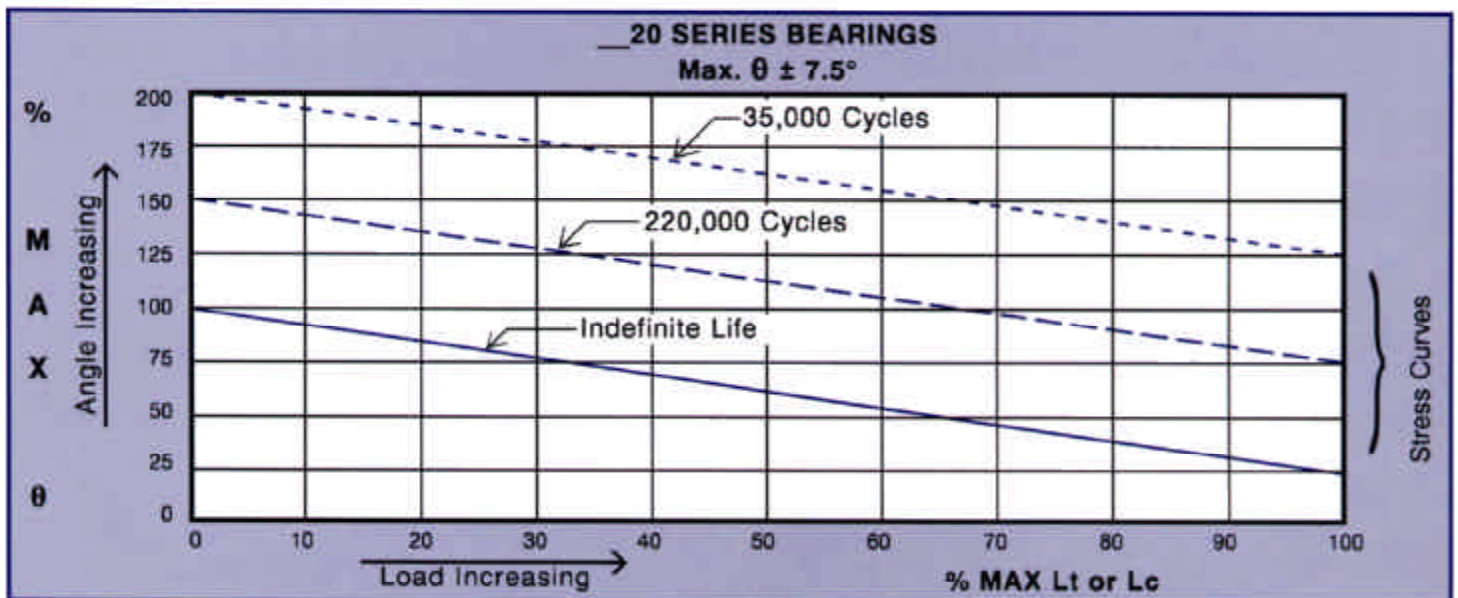
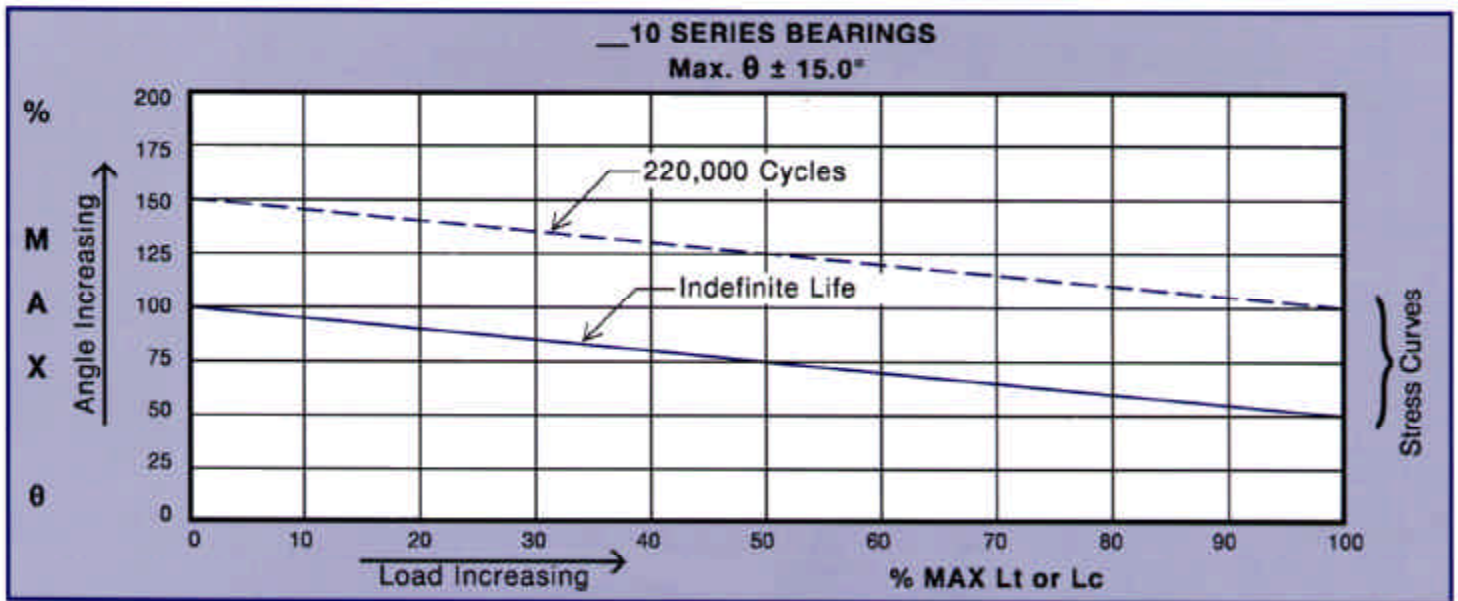


Single End A-10 thru J-30	Double End AD-10 thru JD-30	Dia.	Torsional (1) Spring Rate	Load (2) Capacity		+0 -0.0005 Dia.	±.003 A	B	C	D
				Lc	Lt					
A-10	AD-10	1/8	.0003	0.95	3.80	.1250	.200	.088	.038	.070
A-20	AD-20		.0018	8.90	12.70					
A-30	AD-30		.0148	25.30	25.30					
B-10	BD-10	5/32	.0004	1.40	5.60	.1562	.250	.114	.050	.100
B-20	BD-20		.0037	13.70	19.60					
B-30	BD-30		.0296	39.30	39.30					
C-10	CD-10	3/16	.0007	2.00	7.80	.1875	.300	.136	.060	.120
C-20	CD-20		.0060	19.50	27.90					
C-30	CD-30		.0482	55.80	55.80					
D-10	DD-10	1/4	.0018	3.60	14.20	.250	.400	.184	.083	.165
D-20	DD-20		.0148	35.00	50.00					
D-30	DD-30		.1185	100.00	100.00					
E-10	ED-10	5/16	.0037	5.70	22.80	.3125	.500	.232	.105	.210
E-20	ED-20		.0296	55.00	78.60					
E-30	ED-30		.2367	157.10	157.10					
F-10	FD-10	3/8	.0065	8.40	33.60	.3750	.600	.279	.128	.255
F-20	FD-20		.0482	79.10	113.00					
F-30	FD-30		.4002	226.00	226.00					
G-10	GD-10	1/2	.0148	14.40	57.40	.5000	.800	.374	.173	.345
G-20	GD-20		.1185	140.00	200.00					
G-30	GD-30		.9486	400.00	400.00					
H-10	HD-10	5/8	.0296	23.00	92.00	.6250	1.000	.469	.210	.430
H-20	HD-20		.2367	221.10	315.80					
H-30	HD-30		1.8940	631.50	631.50					
I-10	ID-10	3/4	.0482	32.40	129.40	.7500	1.200	.564	.263	.520
I-20	ID-20		.4002	317.20	453.10					
I-30	ID-30		3.2610	906.10	906.10					
J-10	JD-10	1	.1185	59.20	236.60	1.000	1.600	.764	.363	.720
J-20	JD-20		.9486	566.30	809.00					
J-30	JD-30		7.8023	1616.00	1616.00					

(1) **Torsional Spring rates: Lb-In/Degree** rates of standard C-Flex bearings generally fall within ±10% of these values at zero load. Contact C-Flex if specific spring rates or closer tolerances are required.

(2) **Load Capacity: Lt or Lc (Pounds load in tension or compression)** These values are maximum loading (weight or static force) at zero deflection. Load requirements, angular deflection, and cyclic life must be considered when sizing bearings. See next page for life curves or contact C-Flex for assistance. Lc is pure radial load creating compressive stresses in the spring, while Lt is a pure radial load creating tensile stresses.

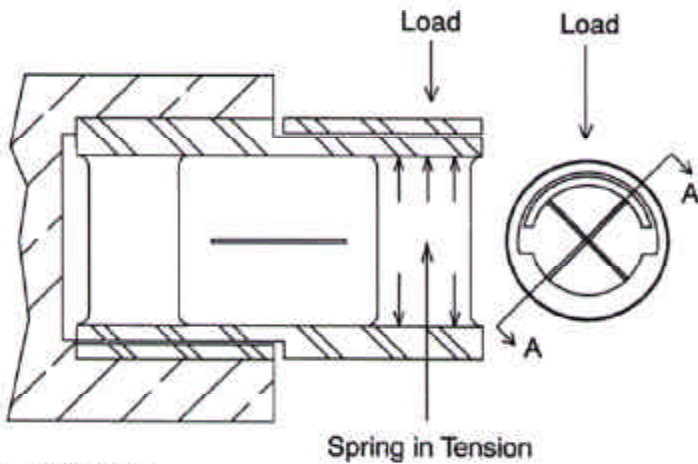
Life Expectancy for Torsional Spring Rates (10, 20, 30)



* MAX θ = (Angle of Deflection) = The deflection angle from the null position. Positive or Negative.

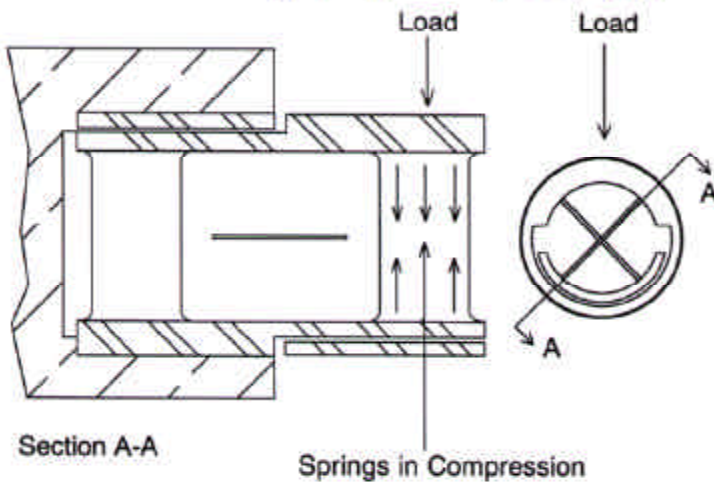
Loading Diagrams with Related Spring Stresses

Radial Loading: Spring in Tension (Lt)



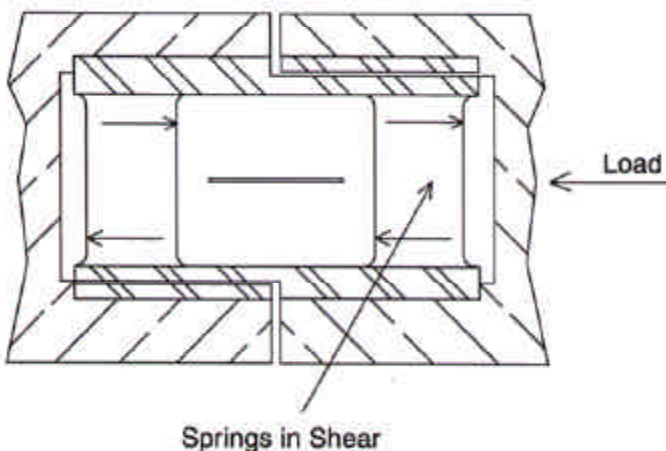
Section A-A

Radial Loading: Spring in Compression (Lc)



Section A-A

Axial Loading: Springs in Shear



Suggested Methods for Installing C-Flex Bearings

The following examples are a few of the possible methods for installing standard C-Flex bearings. Other techniques may provide satisfactory results. Special options, such as flanged or drilled and tapped sleeves may be provided upon request. Please contact C-Flex with questions or a review of mounting requirements.

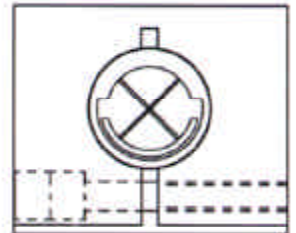
Set Screw

One or more properly sized cup point set screws may be used to clamp bearing in place. Hole size should be .0005" to .0010" larger than bearing.



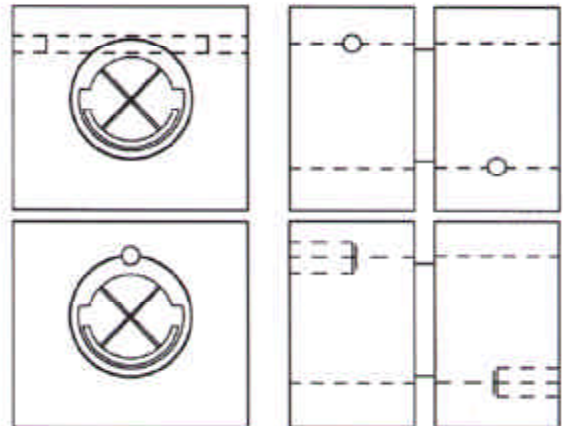
Clamp Screw

Clamping screw applies suitable pressure to retain bearing in place. Hole size should be .0005" to .0010" larger than bearing.



Radial or Axial Pins

Pins may be pressed into holes drilled through the mounting bracket and the bearing sleeve. Care must be exercised to orient the bearing properly so the springs are not damaged. Hole size should be .0005" to .0010" larger than bearing.



Locator Flats

Locator flats with cup point set screws may be used to orient and securely clamp bearing in place. Hole size should be .0005" to .0010" larger than bearing.

