



104 Industrial Drive  
Frankfort, NY 13340 USA  
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**BEARING CO., INC.**

## TECHNICAL DATA



*Frictionless Bearings*  
*- No Lubrication - Low hysteresis - Easy Installation - Custom Design*

**THE BEARING SOLUTION**

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## CONSIDERATIONS FOR THE ENGINEER

### Torsional Spring Rate/Load Capacity

The torsional spring rate and load capacity of C-Flex bearings is dependent upon length, width, and thickness of the internal flat spring beams. High angles of rotation require thin springs to reduce bending stress and thereby result in low torsional spring rates and correspondingly small load capacities. Bearings with thin spring beams, such as the C-Flex Series 10 bearings, typically allow for rotation angles of up to +/- 15 degrees for indefinite life with light loads. In comparison, series 20 bearings which have a heavier spring and can accommodate heavier loads, are rated for rotation angles of +/- 7.5 degrees at zero load for indefinite life while the series 30, which are heavier still, are rated for +/- 3.7 degrees.

### Geometric Centershift

The rotation of the bearing sleeve segments is facilitated by bending of the flat spring beams which support them. This causes a slight radial shift of the sleeve segments relative to each other. For small angles of rotation, such as 2 degrees, the shift of geometric center of the rotated member will be minimal on the order of .02% of the bearing diameter, however increases to approximately 1% of the bearing diameter at a rotation of 15 degrees.

### Cycle Life

The cycle life of C-Flex bearings is based upon the fatigue limit of the materials utilized for the spring beams. Bending and load stresses are considered in determining performance ratings which will statistically result in an infinite cycle life.

The flexure design is suitable for a variety of materials such as stainless steels of the martinitic or precipitation hardening variety: inconel, hastelloy, and beryllium copper among others.

### Hysteresis

The linearity of the C-Flex bearing, measured as the rotational deflection of the pivot vs. the torque required to induce this deflection, is relatively constant for angles of rotation up to 15 degrees. Hysteresis in the C-Flex bearing is defined as the difference of null positions when the flexure is deflected to a plus angle and then relieved, and then deflected to a negative angle and then relieved. The null position after the plus direction compared with the null position after the minus deflection is the angle of hysteresis.

*For additional questions/comments, please do not hesitate to contact us.*

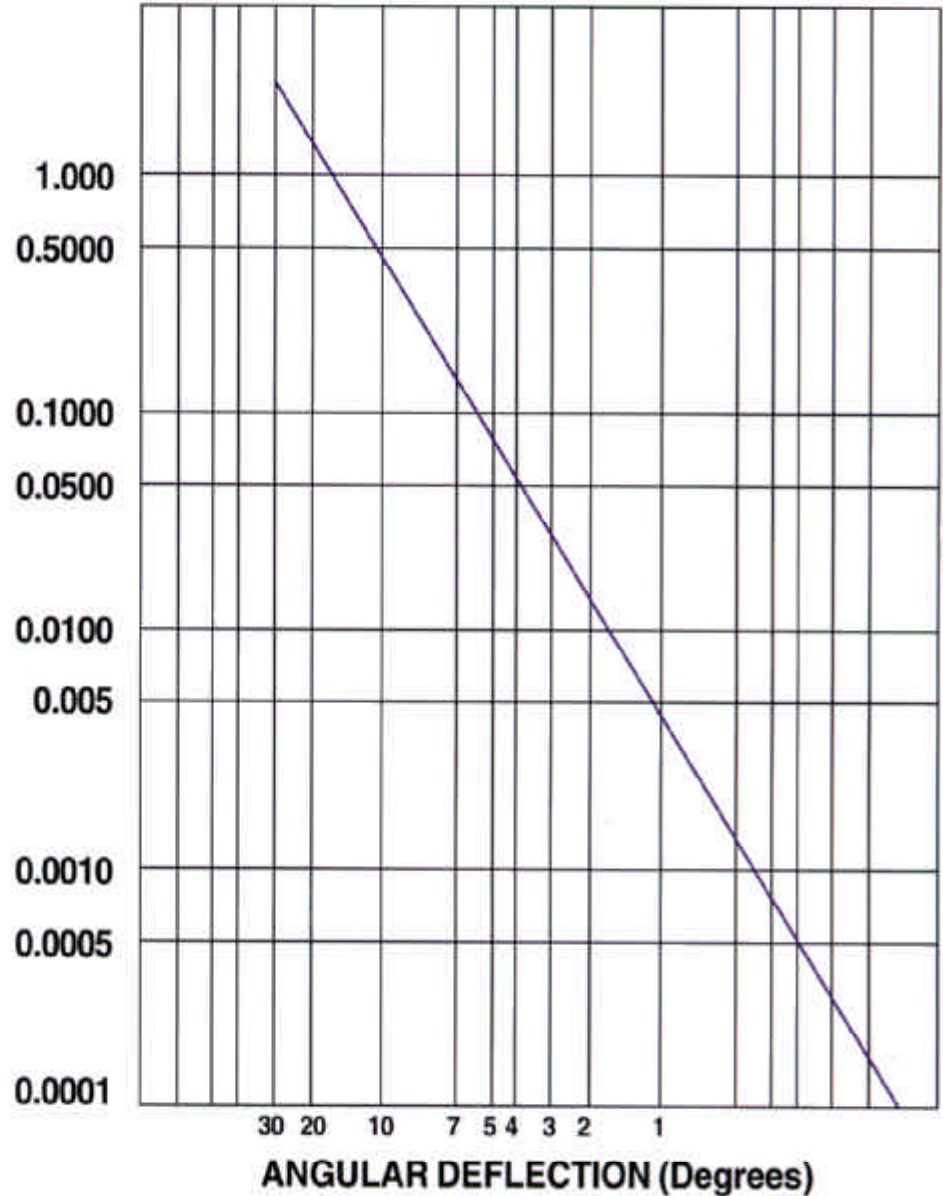


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**C-FLEX BEARING  
 GEOMETRIC CENTERSHIFT vs.  
 ANGULAR DEFLECTION**

**GEOMETRIC  
 CENTERSHIFT  
 (AS A % OF BRG. DIA.)**



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# C-Flex Bearings - Radial and Axial Stiffness Properties

Note: Unless indicated all values under load capacity apply to Cantilever and Double End Bearings.

Lc = Load in compression

Lt = Load in tension

Bearing Series	LOAD CAPACITY			RADIAL STIFFNESS*		
	Lc	Lt	Axial	Lc	Lt	Axial Stiffness
<b>A Series</b>						
10	0.95	3.80	6.08	0.00050	0.00100	0.00050
20	8.90	12.70	12.70	0.00025	0.00050	0.00030
30	25.30	25.30	25.30	0.00017	0.00025	0.00030
<b>B Series</b>						
10	1.40	5.60	8.96	0.00033	0.00050	0.00030
20	13.70	19.60	19.60	0.00017	0.00025	0.00020
30	39.30	39.30	39.30	0.00013	0.00017	0.00013
<b>C Series</b>						
10	2.00	7.80	12.48	0.00025	0.00033	0.00025
20	19.50	27.90	27.90	0.00014	0.00017	0.00013
30	55.80	55.80	55.80	0.00009	0.00011	0.00008
<b>D Series</b>						
10	3.60	14.20	22.72	0.00022	0.00020	0.00014
20	35.00	50.00	50.00	0.00010	0.00011	0.00008
30	100.00	100.00	100.00	0.00006	0.00008	0.00005
<b>E Series</b>						
10	5.70	22.80	36.48	0.00014	0.00014	0.00010
20	55.00	78.60	78.60	0.00008	0.00008	0.00006
30	157.10	157.10	157.10	0.00005	0.00006	0.00004
<b>F Series</b>						
10	8.40	33.60	53.76	0.00013	0.00008	0.00010
20	79.10	113.00	113.00	0.00007	0.00006	0.00006
30	226.00	226.00	226.00	0.00005	0.00003	0.00004
<b>G Series</b>						
10	14.40	57.40	91.84	0.00010	0.00006	0.00008
20	140.00	200.00	200.00	0.00005	0.00003	0.00005
30	400.00	400.00	400.00	0.00003	0.00002	0.00003
<b>H Series</b>						
10	23.00	92.00	147.20	0.00008	0.00005	0.00006
20	221.10	315.80	315.80	0.00004	0.00002	0.00003
30	631.50	631.50	631.50	0.00003	0.00002	0.00002
<b>I Series</b>						
10	32.40	129.40	207.40	0.00006	0.00004	0.00005
20	317.20	453.10	453.10	0.00003	0.00002	0.00003
30	906.10	906.10	906.10	0.00002	0.00001	0.00002
<b>J Series</b>						
10	59.20	236.60	378.88	0.00005	0.00003	0.00004
20	566.30	809.00	809.00	0.00002	0.00001	0.00002
30	1616.00	1616.00	1616.00	0.00001	0.00001	0.00001

1. Stiffness of bearing is rated in inches of deflection per pound of load.

2.\* This data applies to standard cantilever bearings loaded at the mid-point of the unsupported half, at 0 degrees rotation.

3.\* The total stiffness of a pair of tandem mounted cantilevered bearings connected very stiffly in a mechanical system may be determined by dividing the above values by **three**.

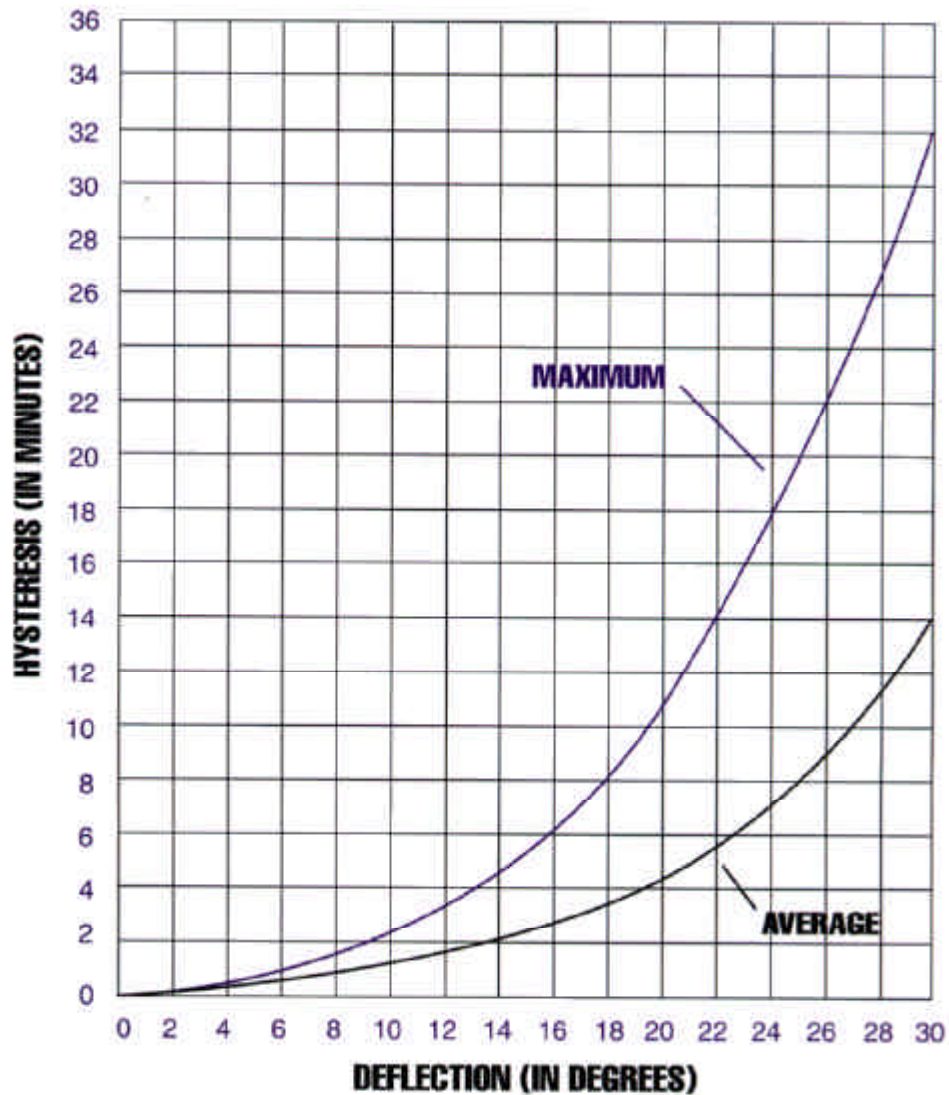
4.\* For double ended bearings of the same sizes and types as above, divide the above values by **two**.



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## Hysteresis Curve Type 10 Bearing



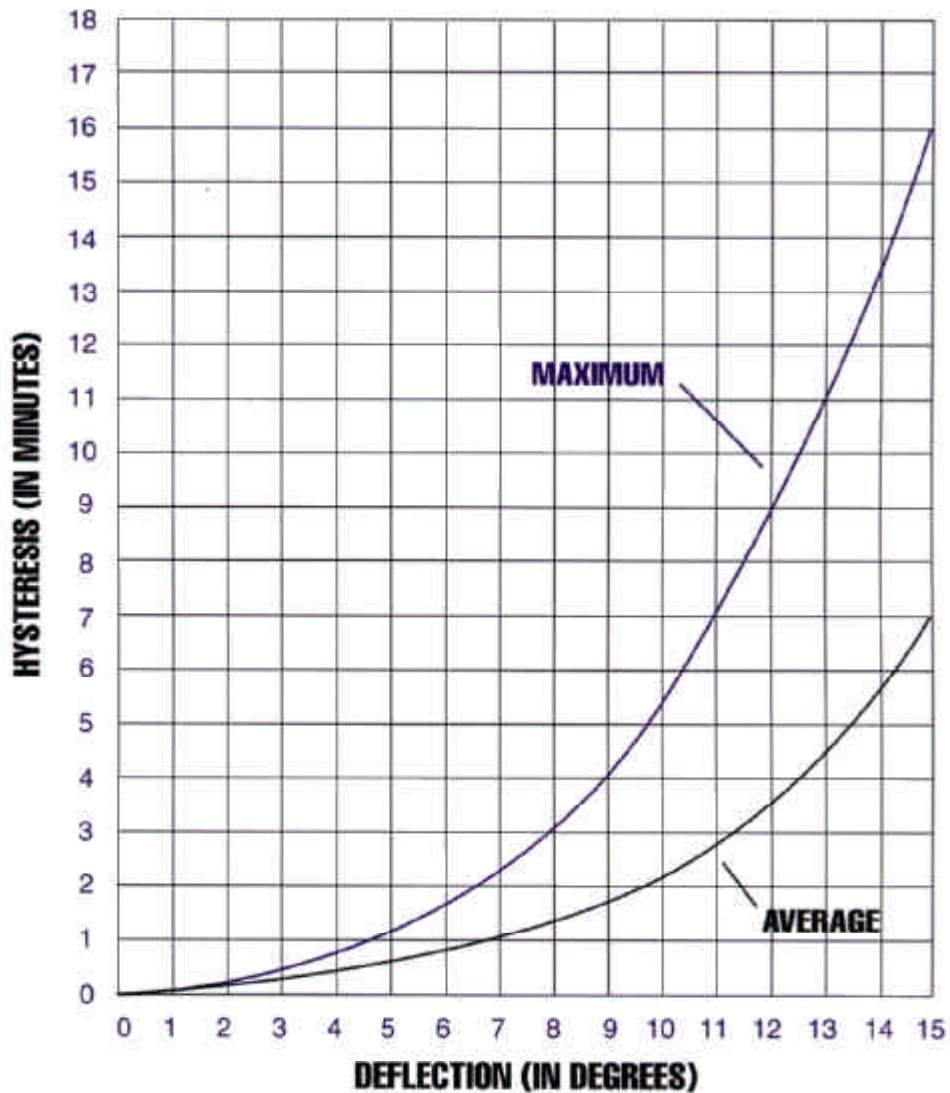
HYSTERESIS IN C-FLEX BEARINGS IS DEFINED AS THE DIFFERENCE OF NULL POSITIONS WHEN THE BEARING IS DEFLECTED TO A PLUS ANGLE AND THEN RELIEVED, AND THEN DEFLECTED TO AN EQUAL MINUS ANGLE AND THEN RELIEVED. THE NULL POSITION AFTER THE PLUS DEFLECTION COMPARED WITH THE NULL POSITION AFTER THE MINUS DEFLECTION IS THE ANGLE OF HYSTERESIS.



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## Hysteresis Curve Type 20 Bearing



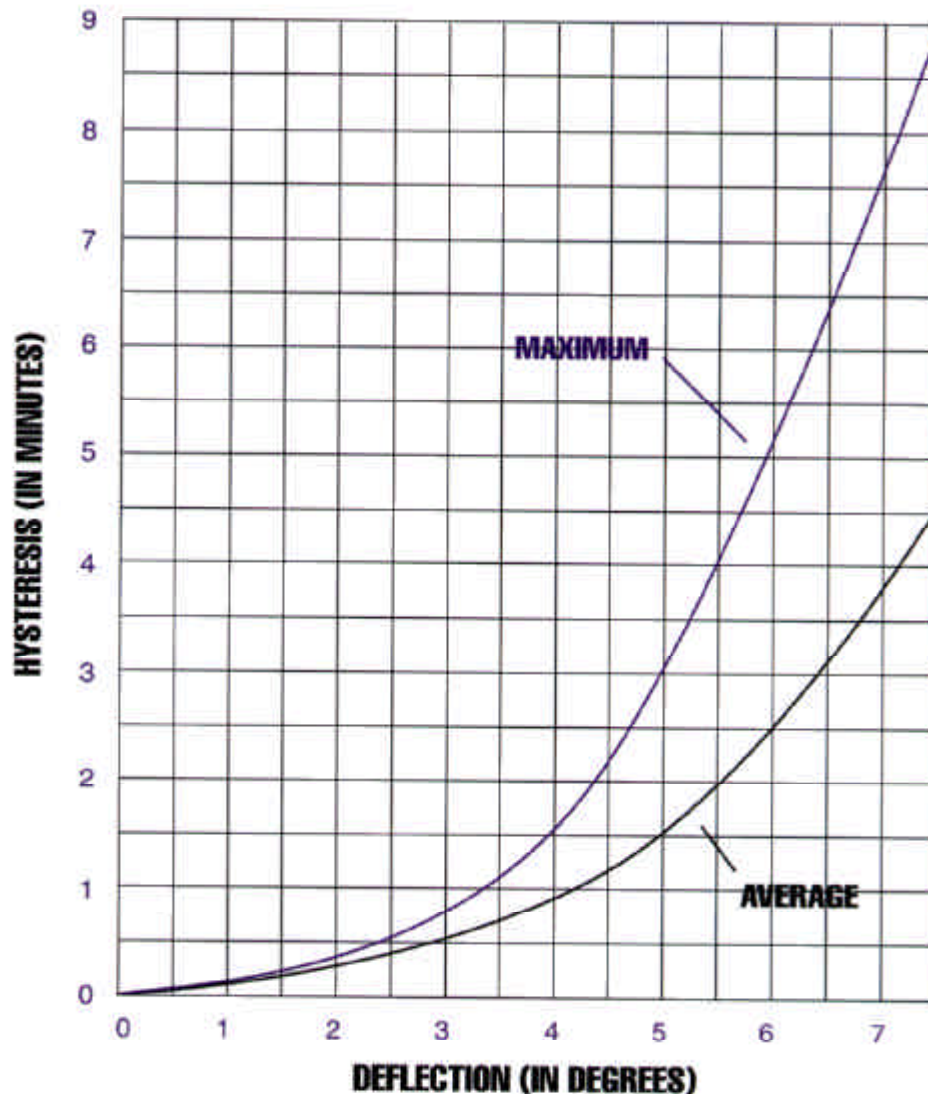
HYSTERESIS IN C-FLEX BEARINGS IS DEFINED AS THE DIFFERENCE OF NULL POSITIONS WHEN THE BEARING IS DEFLECTED TO A PLUS ANGLE AND THEN RELIEVED, AND THEN DEFLECTED TO AN EQUAL MINUS ANGLE AND THEN RELIEVED. THE NULL POSITION AFTER THE PLUS DEFLECTION COMPARED WITH THE NULL POSITION AFTER THE MINUS DEFLECTION IS THE ANGLE OF HYSTERESIS.



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## Hysteresis Curve Type 30 Bearing



HYSTERESIS IN C-FLEX BEARINGS IS DEFINED AS THE DIFFERENCE OF NULL POSITIONS WHEN THE BEARING IS DEFLECTED TO A PLUS ANGLE AND THEN RELIEVED, AND THEN DEFLECTED TO AN EQUAL MINUS ANGLE AND THEN RELIEVED. THE NULL POSITION AFTER THE PLUS DEFLECTION COMPARED WITH THE NULL POSITION AFTER THE MINUS DEFLECTION IS THE ANGLE OF HYSTERESIS.

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## **C-Flex Bearing Facilities List**

### *In - House Capabilities and Equipment*

- Stocked product line: C-Flex Frictionless Bearings from 1/8" diameter to 1" •
  - Prototype and Customized Flexures •
  - Manufacturing of metal products to customer specifications •
    - Brazing Services •

- CNC Lathe, Hitachi-Seiki
- CNC Lathe, Hardinge COBRA 42
- 3 HP Lathe, Harrison
- #4 Turret Lathe, WARNER-SWASEY
- HAAS CNC Machining Center
- ACER Milling Machine
- Horizontal Milling, CINCINNATI
- Centerless Grinder
- 6" x 8" Surface Grinder, ACER
- Surface Grinder with diamond roll dressing unit
- Electro-Chemical Grinder
- Large OD Grinder (24" wheel x 2" wide)
- (2) Wire EDM, BROTHER
- Sand Blaster
- Bench Press
- Arbor Press, 7-9 ton
- Sheet Metal Roller
- TIG Welding Machines
- (2) Belt Furnaces, LINDBERG
- Induction Brazing
- Pedestal Drill
- Sta-Warm Melting Pot
- CMM Inspection Machine
- Tube Bender
- Shear, 100 Series
- Punch Presses, 20 and 5 ton

*6200 square feet of production space.  
Inventory and Warehouse space available.*

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