

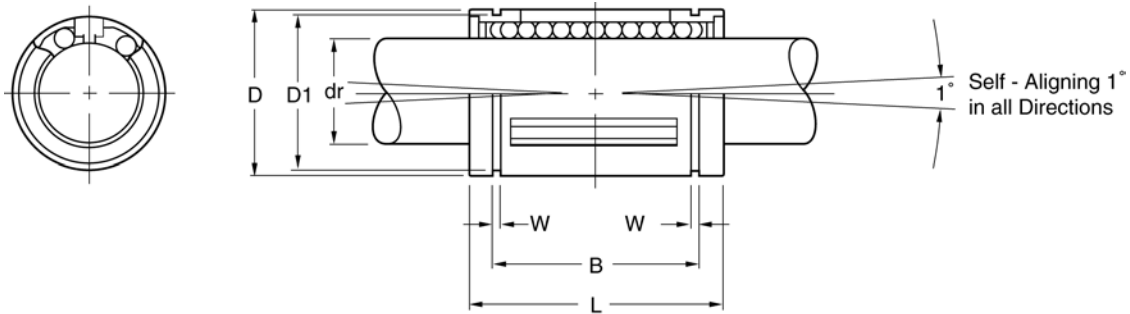
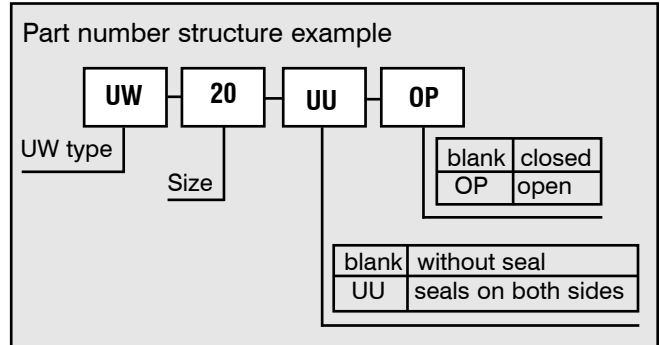


# Unlimited Travel Slides

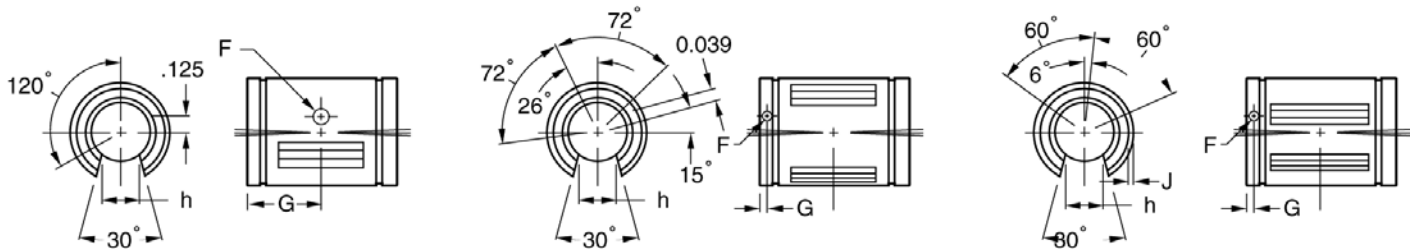
## Ultimate Recirculating Ball Bearings

The New **Ultimate** from *Tusk* was designed and built to offer engineers and designers the latest in Linear Bearing Technology. The **Ultimate** from *Tusk* offers among the highest Linear Bearing capacities available in today's market while still addressing the most basic concerns such as interchangeability, life and coefficient of friction

The New **Ultimate** from *Tusk* is designed to be used in applications which require high capacity, self alignment for easy installation, and smooth/quiet travel. The **Ultimate** fits into standard housing bore specifications and is used in conjunction with standard FW and FW-SS shafting. The preload adjustment feature is standard on all **Ultimate** units.



part number						major dimensions					
UW	closed type		open type			dr	D	L			
	no.of ball circuits	mass lbs	no.of ball circuits	mass lbs	tolerance*			lbs.	inch	tolerance*	
					inch	inch		inch	inch		
UW 3	4	.004	—	—	—	.1875	0	.3750	.562	±.008	
UW 4	4	.009	—	—	—	.2500		.5000	.750	0	
UW 6	4	.014	—	—	—	.3750		.6250	.875	—0.015	
UW 8	4	.043	UW 8-OP	3	.033	.5000		.8750	1.250	0	
UW 10	5	.103	UW 10-OP	4	.083	.6250		1.1250	1.500		
UW 12	6	.123	UW 12-OP	5	.102	.7500		1.2500	1.625		—0.020
UW 16	6	.265	UW 16-OP	5	.220	1.0000		1.5625	2.250		
UW 20	6	.485	UW 20-OP	5	.419	1.2500	0	2.0000	2.625	0/—0.025	
UW 24	6	.750	UW 24-OP	5	.639	1.5000	—0.0006	2.3750	3.000	0/—0.030	
UW 32	6	1.411	UW 32-OP	5	.1.168	2.0000	0/—0.0008	3.0000	4.000	0/—0.040	



**The Ultimate** is completely interchangeable with conventional *Tusk* Recirculating Ball Bearings as well as directly with all standard industry dimensions. This includes all basic dimensions of length\*, working diameters, outside diameters as well as the less obvious dimensions such as distance between retainers, retention hole locations and retainer widths.

**The New Ultimate from Tusk is offered in two basic configurations: Closed - Open**

**Both types are clearance adjustable and available with seals.**

\*The seals used in the New Ultimate Linear Bearings are integral to the bearing and are not an added after thought. The sealed versions do not add to overall length and are full floating. They are allowed to float on the shaft surface as the bearing aligns itself thus providing good shaft contact without generating unnecessary drag.

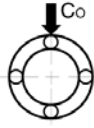
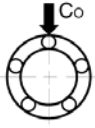
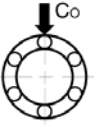
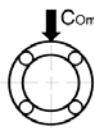
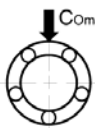
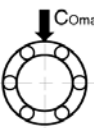
inch	B tolerance inch	W inch	D <sub>1</sub> inch	open type				basic load rating		nominal shaft diam- eter inch
				h	F	G	J	dynamic C	static C <sub>o</sub>	
				inch	inch	inch	inch	lbs.	lbs.	
—	—	—	—	—	—	—	—	35	47	3/16
.515	0	.0390	.4687	—	—	—	—	60	80	1/4
.703	— .015	.0390	.5880	—	—	—	—	95	120	3/8
1.032	0 — .020	.0459	.8209	.313	.136	.6250	through	230	290	1/2
1.112		.0559	1.0590	.375	.105	.1250	.0390	400	500	5/8
1.272		.0559	1.1760	.438	.136	.1250	.0590	470	590	3/4
1.886		.0679	1.4687	.563	.136	.1250	.0470	850	1,060	1
2.011	0/— .025	.0679	1.8859	.625	.201	.1875	.0900	1,230	1,530	1-1/4
2.422	0/— .030	.0859	2.2389	.750	.201	.1875	.0900	1,480	1,850	1-1/2
3.206	0/— .040	.1029	2.8379	1.000	.265	.3125	through	2,430	3,040	2

**Basic Static Load Rating:**

If a slide is loaded when it is in a stationary condition or working at low speed, a permanent elastic deformation is formed on the rolling element. The deformation prevents smooth movement of the bushing. To eliminate this possibility, the static load rating must not be exceeded.

**Relation Between Ball Circuits and Load Ratings:**

The load rating of a slide varies according to the loaded position on the circumference. The value in the dimensional table indicates the lowest load rating with the load placed on top of one ball circuit. If the slide is used with two ball circuits loaded uniformly, the value will be greater. Table C-2 shows the load ratio for the number of ball circuits in each case.

Number Of Rows	4	5	6
Co (Load Rating Specified On The Table)			
Comax (Maximum Load Rating)			
Load Ratio Comax/Co	1,414	1,463	1,280

**Clearance and Fit:**

An appropriate clearance between the slide and shaft is required in ultimate operation. Inadequate clearance may cause early failure and/or poor, rough movement. Proper clearance is determined by shaft diameter and housing bore. Table C-4 shows Tusk's recommended tolerances of the shaft and housing bore in order to maintain the appropriate clearance.

Table C-4 Recommended tolerance for shaft O.D. and housing bore.

size	shaft dia.		housing bore.	
	dr inch	tol.(g6) inch	D inch	tol.(H7) inch
<b>UW 3</b>	.1875	-.0002	.3750	+.0005 0
<b>UW 4</b>	.2500		.5000	+.0007 0
<b>UW 6</b>	.3750	-.0006	.6250	+.0008 0
<b>UW 8</b>	.5000	-.0002	.8750	
<b>UW10</b>	.6250	-.0007	1.1250	+.0010 0
<b>UW12</b>	.7500	-.0003	1.2500	
<b>UW16</b>	1.0000	-.0008	1.5625	+.0012 0
<b>UW20</b>	1.2500	-.0004	2.0000	
<b>UW24</b>	1.5000	-.0010	2.3750	
<b>UW32</b>	2.0000	-.0004 -.0012	3.0000	

### Shaft and Housing:

To Optimize performance, high precision shafts and housings are required.

1. Shaft: Dimensional tolerance, surface finish and hardness greatly affect the traveling performance of the Ultimate. The shaft must be manufactured to the following tolerances.

A. A surface finish of 0.4Ra or less.

B. Hardness of 60 HRC or more. Hardness less than 60 HRC decreases the life considerably and reduces the permissible load.

C. The correct tolerance of the shaft diameter is recommended on Table C-3 and C-4

The Tusk slide shaft is an ideal component manufactured to these specifications.

2. Housing: There are a wide range of designs and manufacturing techniques for mounted housings. Tusk pre-engineered slide units are also available.

### Mounting:

Ultimate is designed to be press fitted into the housing bore. When inserting slide, however, don't apply excess force nor shock load which may cause permanent damage.

### Examples of Mounting

The following examples (Figures C-5 to C-8) Illustration assembly of the inserted slide as they should be designed and mounted.

Figure C-5 Use of holding plates

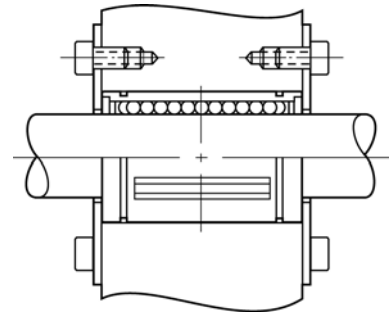


Figure C-6 Adjustable type housing

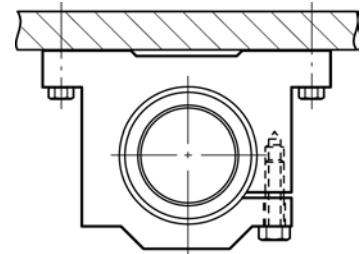


Figure C-7 Use of external retaining rings

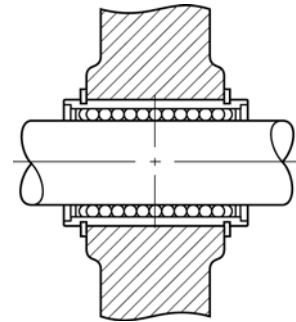
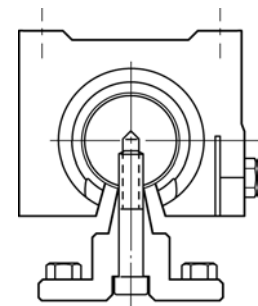


Figure C-8 Open type housing





# Unlimited Travel Slides

## Recirculating Ball Bearings

### Unlimited linear motion

- High load capacity
- Low frictional coefficient
- High rigidity and precision
- Smooth motion with low noise

Tusk high quality Recirculating Ball Bearings offer high load capacity and unlimited smooth linear motion. The outside cylinder of this bearing, made of high-carbon chromium bearing steel, encloses a seamless retainer with grooves to guide three to eight ball circuits with minimum friction and high performance.

Select from 42 models with bearing bore diameters from .25" to 1". Five types meet all your requirements - High Lubricity Retainer, Self-aligning, Sealed, Clearance Adjusting, and Open. Applications include: machine tools, industrial machines, electronic equipment, optical instruments, food processing machines, and measuring instruments, or wherever smooth linear motion is needed.



WW G

### High lubricity retainer

Our popular WW G type ensures smooth linear motion with low noise and high performance.



WW GR

### Self-aligning type

In the WW GR types, the center of the outside cylinder profile is convex enabling adjustment of the angle for the axial offset. This structure allows easy assembling.



WW...UU

### Sealed type - Model UU

Integral rubber seals on both sides of the WW...UU type bearings keep out dust, keep in lubricant, and eliminate the need for installation of separate seals. Available for all G and GR models in diameters from .25" - 1".



WW...AJ

### Clearance adjusting type - Model AJ

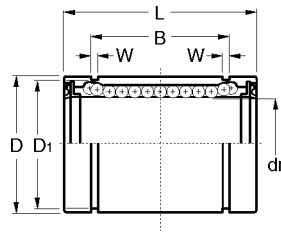
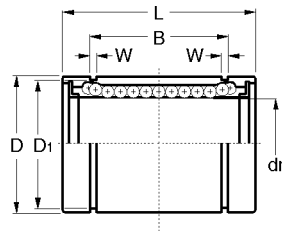
WW...AJ type models feature an axial slit in the outside cylinder to allow adjustment of the shaft clearance. Can be used when assembled in a Recirculating Ball Bearing Pillow Block with adjustable bore diameter.



WW...OP

### Open type - Model OP

The outside cylinder of the WW...OP type has an opening equal to one circuit of balls. This opening allows installation of a support rail for reinforcement to eliminate shaft deflection when very long shafts or additional rigidity are a requirement.

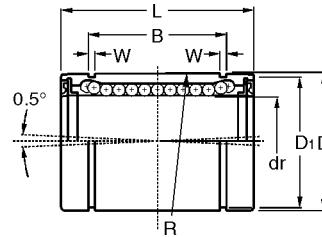
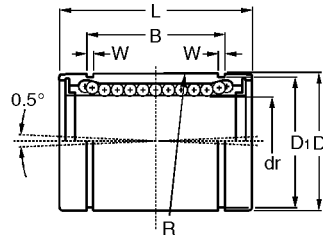


## WW G TYPE

### SHAFT DIAMETER

### RECIRCULATING BALL BEARING MODEL NUMBER

INCHES	MODEL	BALL CIRCUIT	WEIGHT OZ.	MODEL	BALL CIRCUIT	WEIGHT OZ.	ECCENTRICITY INCH	RADIAL CLEARANCE (MAX) INCH	BASIC DYNAMIC LOAD RATING LB	BASIC STATIC LOAD RATING LB
.250	WW-4G	4	.28	---	---	---	.0005	-.0001	46	60
.250	WW-4GUU	4	.28	WW-4G-AJ	4	.26	.0005	-.0001	46	60
.375	WW-6G	4	.49	---	---	---	.0005	-.0001	51	71
.375	WW-6GUU	4	.49	WW-6G-AJ	4	.48	.0005	-.0001	51	71
.500	WW-8G	4	1.3	WW-8G-OP	3	.99	.0005	-.0002	115	174
.500	WW-8GUU	4	1.3	WW-8G-AJ	4	1.3	.0005	-.0002	115	174
.625	WW-10G	4	2.7	WW-10G-OP	3	2.0	.0005	-.0002	174	265
.625	WW-10GUU	4	2.7	WW-10G-AJ	4	2.6	.0005	-.0002	174	265
.750	WW-12G	5	3.4	WW-12G-OP	4	2.7	.0006	-.0002	194	309
.750	WW-12GUU	5	3.4	WW-12G-AJ	5	3.3	.0006	-.0002	194	309
1.000	WW-16G	6	7.1	WW-16G-OP	5	6.0	.0006	-.0002	221	353
1.000	WW-16GUU	6	7.1	WW-16G-AJ	6	7.0	.0006	-.0002	221	353

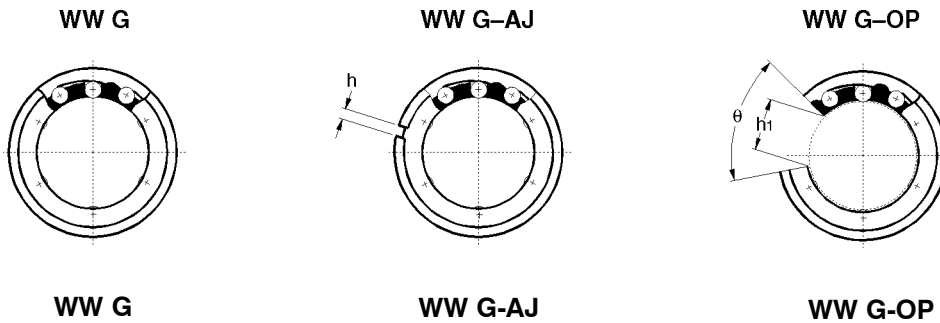


## WW GR TYPE

### SHAFT DIAMETER

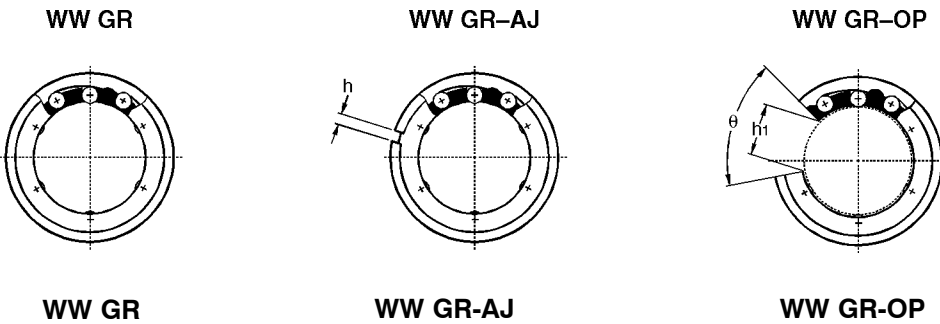
### RECIRCULATING BALL BEARING MODEL NUMBER

INCHES	MODEL	BALL CIRCUIT	WEIGHT OZ.	MODEL	BALL CIRCUIT	WEIGHT OZ.	ECCENTRICITY INCH	RADIAL CLEARANCE (MAX) INCH	BASIC DYNAMIC LOAD RATING LB	BASIC STATIC LOAD RATING LB
.250	WW-4GR	4	.28	---	---	---	.0005	-.0001	46	60
.250	WW-4GRUU	4	.28	---	---	---	.0005	-.0001	46	60
.375	WW-6GR	4	.49	---	---	---	.0005	-.0001	51	71
.375	WW-6GRUU	4	.49	---	---	---	.0005	-.0001	51	71
.500	WW-8GR	4	1.4	WW-8GR-OP	3	.99	.0005	-.0001	115	174
.500	WW-8GRUU	4	1.4	WW-8GR-AJ	4	1.3	.0005	-.0001	115	174
.625	WW-10GR	4	2.7	WW-10GR-OP	3	2.0	.0005	-.0001	174	265
.625	WW-10GRUU	4	2.7	WW-10GR-AJ	4	2.6	.0005	-.0001	174	265
.750	WW-12GR	5	3.4	WW-12GR-OP	4	2.7	.0006	-.0002	194	309
.750	WW-12GRUU	5	3.4	WW-12GR-AJ	5	3.3	.0006	-.0002	194	309
1.000	WW-16GR	6	7.1	WW-16GR-OP	5	6.0	.0006	-.0002	221	353
1.000	WW-16GRUU	6	7.1	WW-16GR-AJ	6	7.0	.0006	-.0002	221	353



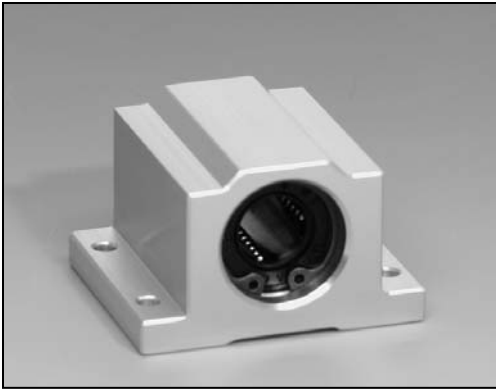
BOUNDARY DIMENSIONS AND TOLERANCE

dr		D		L		B		W	D <sub>1</sub>	h	h <sub>1</sub>	∅	SHAFT DIAMETER
INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	INCH	INCH	INCH		INCHES
.2500	0-.00040	.5000	0-.00045	.7500	0-.008	.5110	0-.008	.0390	.4687	.04	---	---	.250
.2500	0-.00040	.5000	0-.00045	.7500	0-.008	.5110	0-.008	.0390	.4687	.04	---	---	.250
.3750	0-.00040	.6250	0-.00050	.8750	0-.008	.6358	0-.008	.0390	.5880	.04	---	---	.375
.3750	0-.00040	.6250	0-.00050	.8750	0-.008	.6358	0-.008	.0390	.5880	.04	---	---	.375
.5000	0-.00040	.8750	0-.00050	1.2500	0-.008	.9625	0-.008	.0459	.8209	.06	.34	80°	.500
.5000	0-.00040	.8750	0-.00050	1.2500	0-.008	.9625	0-.008	.0459	.8209	.06	.34	80°	.500
.6250	0-.00040	1.1250	0-.00050	1.5000	0-.008	1.1039	0-.008	.0559	1.0590	.06	.375	80°	.625
.6250	0-.00040	1.1250	0-.00050	1.5000	0-.008	1.1039	0-.008	.0559	1.0590	.06	.375	80°	.625
.7500	0-.00040	1.2500	0-.00065	1.6250	0-.008	1.1657	0-.008	.0559	1.1760	.06	.4375	60°	.750
.7500	0-.00040	1.2500	0-.00065	1.6250	0-.008	1.1657	0-.008	.0559	1.1760	.06	.4375	60°	.750
1.000	0-.00040	1.5625	0-.00065	2.2500	0-.012	1.7547	0-.012	.0679	1.4687	.06	.46	50°	1.000
1.000	0-.00040	1.5625	0-.00065	2.2500	0-.012	1.7547	0-.012	.0679	1.4687	.06	.46	50°	1.000



BOUNDARY DIMENSIONS AND TOLERANCE

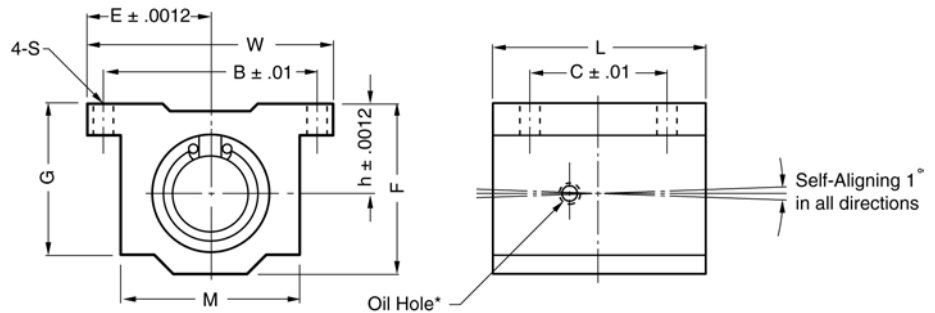
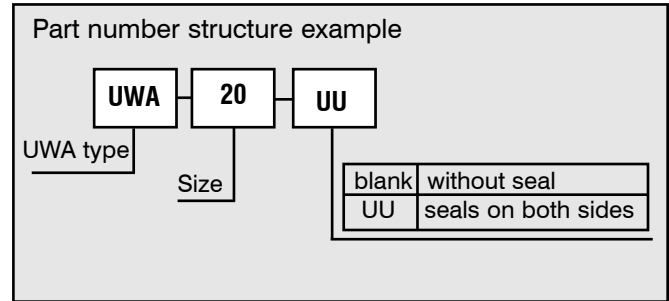
dr		D		L		B		W	D <sub>1</sub>	h	h <sub>1</sub>	∅	SHAFT DIAMETER
INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	TOLERANCE INCH	INCH	INCH	INCH	INCH		INCHES
.2500	0-.00040	.5000	0-.00045	.7500	0-.008	.5110	0-.008	.0390	.4687	.04	---	---	.250
.2500	0-.00040	.5000	0-.00045	.7500	0-.008	.5110	0-.008	.0390	.4687	.04	---	---	.250
.3750	0-.00040	.6250	0-.00050	.8750	0-.008	.6358	0-.008	.0390	.5880	.04	---	---	.375
.3750	0-.00040	.6250	0-.00050	.8750	0-.008	.6358	0-.008	.0390	.5880	.04	---	---	.375
.5000	0-.00040	.8750	0-.00050	1.2500	0-.008	.9625	0-.008	.0459	.8209	.06	.34	80°	.500
.5000	0-.00040	.8750	0-.00050	1.2500	0-.008	.9625	0-.008	.0459	.8209	.06	.34	80°	.500
.6250	0-.00040	1.1250	0-.00050	1.5000	0-.008	1.1039	0-.008	.0559	1.0590	.06	.375	80°	.625
.6250	0-.00040	1.1250	0-.00050	1.5000	0-.008	1.1039	0-.008	.0559	1.0590	.06	.375	80°	.625
.7500	0-.00040	1.2500	0-.00065	1.6250	0-.008	1.1657	0-.008	.0559	1.1760	.06	.4375	60°	.750
.7500	0-.00040	1.2500	0-.00065	1.6250	0-.008	1.1657	0-.008	.0559	1.1760	.06	.4375	60°	.750
1.000	0-.00040	1.5625	0-.00065	2.2500	0-.012	1.7547	0-.012	.0679	1.4687	.06	.46	50°	1.000
1.000	0-.00040	1.5625	0-.00065	2.2500	0-.012	1.7547	0-.012	.0679	1.4687	.06	.46	50°	1.000



# Unlimited Travel Slides

## Ultimate Recirculating Bearing Pillow Blocks

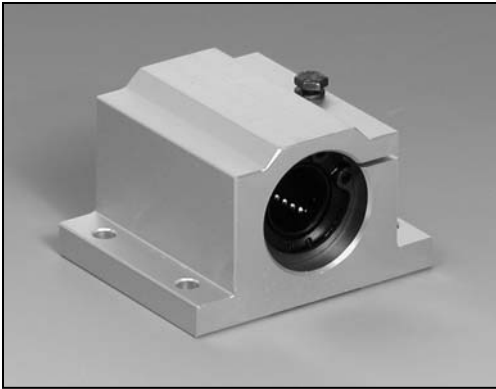
**The New Ultimate** from *Tusk* was designed and built to offer engineers and designers the latest in Linear Bearing Technology. **The Ultimate** offers among the highest Linear Bearing capacities available in today's market while still addressing the most basic concerns such as interchangeability, life and coefficient of friction. **The New Ultimate** from *Tusk* is designed to be used in applications which require highest capacity, self alignment for easy installation, and smooth quiet travel due to precision ground raceways.



part number	nom. shaft dia. inch	major dimensions								mounting dimensions			basic load rating		mass lbs
		h	E	W	L	F	T	G	M	B	C	S	dynamic C	static Co	
		inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	inch	lbs	lbs	
<b>UWA 4UU</b>	1/4	.4370	.8125	1.625	1.188	.813	.188	.750	1.000	1.312	.750	.156	60	80	.090
<b>UWA 6UU</b>	3/8	.5000	.8750	1.750	1.313	.938	.188	.875	1.125	1.437	.875	.156	95	120	.120
<b>UWA 8UU</b>	1/2	.6870	1.0000	2.000	1.688	1.250	.250	1.125	1.375	1.688	1.000	.156	230	290	.248
<b>UWA 10UU</b>	5/8	.8750	1.2500	2.500	1.938	1.625	.281	1.437	1.750	2.125	1.125	.188	400	500	.465
<b>UWA 12UU</b>	3/4	.9370	1.3750	2.750	2.063	1.750	.313	1.563	1.875	2.375	1.250	.188	470	590	.553
<b>UWA 16UU</b>	1	1.1870	1.6250	3.250	2.813	2.188	.375	1.938	2.375	2.875	1.750	.219	850	1060	1.200
<b>UWA 20UU</b>	1-1/4	1.5000	2.0000	4.000	3.625	2.813	.438	2.500	3.000	3.500	2.000	.219	1230	1530	2.380
<b>UWA 24UU</b>	1-1/2	1.7500	2.3750	4.750	4.000	3.250	.500	2.875	3.500	4.125	2.500	.281	1480	1850	3.460
<b>UWA 32UU</b>	2	2.1250	3.0000	6.000	5.000	4.063	.625	3.625	4.500	5.250	3.250	.406	2430	3040	6.830

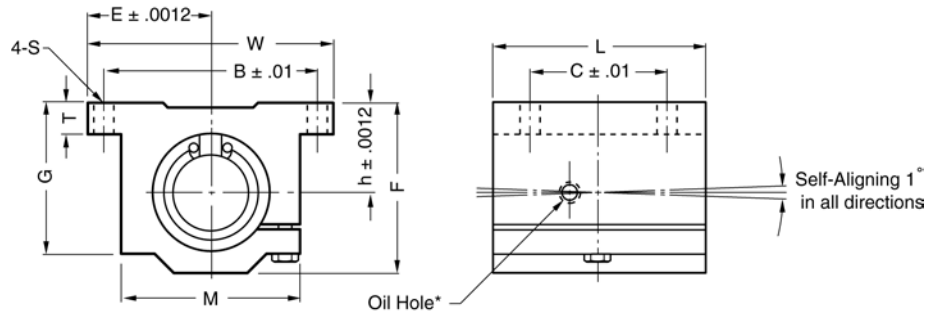
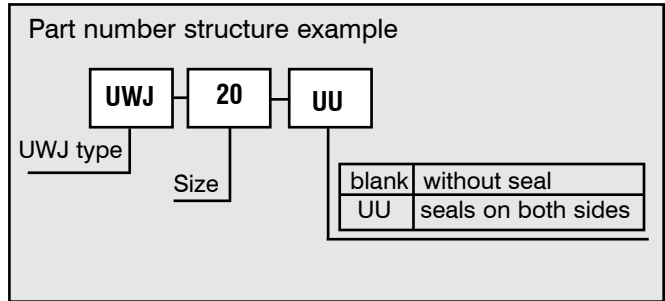
Provided with push in oil fitting for 1/4" to 1/2" sizes. Sizes from 5/8" to 2" offer a 1/4-28 tapped hole with a plug for adding a fitting if desired.





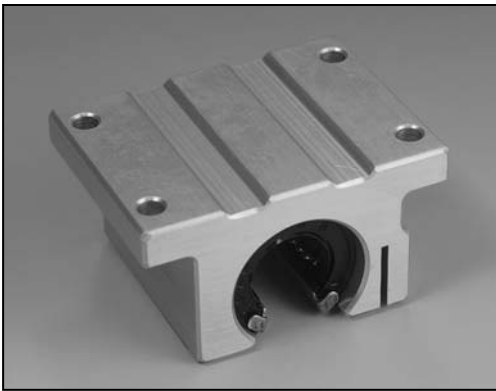
# Unlimited Travel Slides

## Ultimate Recirculating Bearing Pillow Blocks



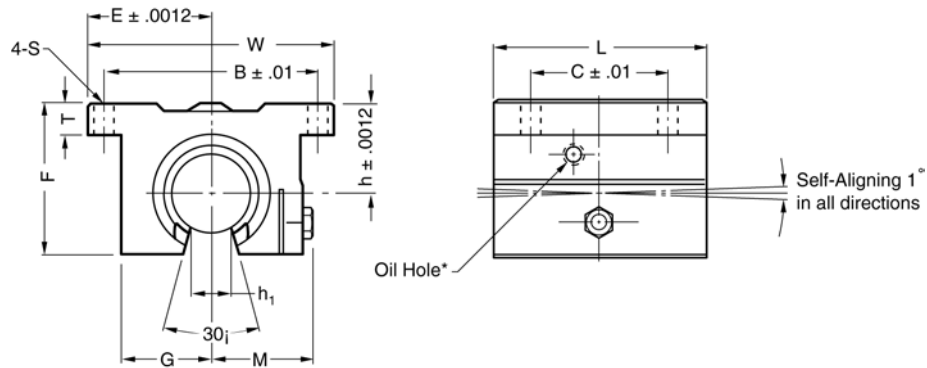
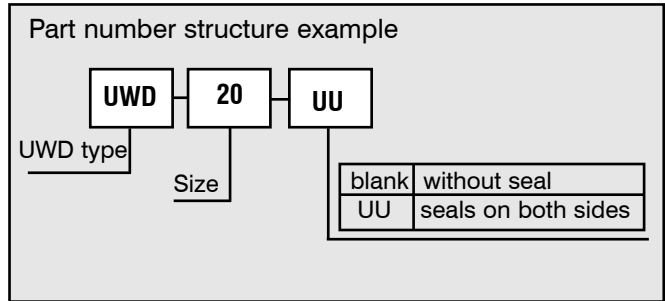
part number	nom. shaft dia. inch	major dimensions								mounting dimensions			basic load rating		mass lbs
		h	E	W	L	F	T	G	M	B	C	S	dynamic C lbs	static Co lbs	
UWJ 4UU	1/4	.4370	.8125	1.625	1.188	.813	.188	.750	1.000	1.312	.750	.156	60	80	.090
UWJ 6UU	3/8	.5000	.8750	1.750	1.313	.938	.188	.875	1.125	1.437	.875	.156	95	120	.120
UWJ 8UU	1/2	.6870	1.0000	2.000	1.688	1.250	.250	1.125	1.375	1.688	1.000	.156	230	290	.248
UWJ 10UU	5/8	.8750	1.2500	2.500	1.938	1.625	.281	1.437	1.750	2.125	1.125	.188	400	500	.465
UWJ 12UU	3/4	.9370	1.3750	2.750	2.063	1.750	.313	1.563	1.875	2.375	1.250	.188	470	590	.553
UWJ 16UU	1	1.1870	1.6250	3.250	2.813	2.188	.375	1.938	2.375	2.875	1.750	.219	850	1060	1.200
UWJ 20UU	1-1/4	1.5000	2.0000	4.000	3.625	2.813	.438	2.500	3.000	3.500	2.000	.219	1230	1530	2.380
UWJ 24UU	1-1/2	1.7500	2.3750	4.750	4.000	3.250	.500	2.875	3.500	4.125	2.500	.281	1480	1850	3.460
UWJ 32UU	2	2.1250	3.0000	6.000	5.000	4.063	.625	3.625	4.500	5.250	3.250	.406	2430	3040	6.830

Provided with push in oil fitting for 1/4" to 1/2" sizes. Sizes from 5/8" to 2" offer a 1/4-28 tapped hole with a plug for adding a fitting if desired.



# Unlimited Travel Slides

## Ultimate Recirculating Bearing Pillow Blocks



part number	nom. shaft dia. inch	major dimensions									mounting dimensions			basic load rating		mass lbs
		h	E	W	L	F	T	G	M	h <sub>1</sub>	B	C	S	dynamic C lbs	static Co lbs	
<b>UWD 8UU</b>	1/2	.6870	1.000	2.000	1.500	1.100	.250	.688	.98	.260	1.688	1.000	.156	230	290	.188
<b>UWD 10UU</b>	5/8	.8750	1.2500	2.500	1.750	1.405	.281	.875	1.15	.319	2.125	1.125	.188	400	500	.365
<b>UWD 12UU</b>	3/4	.9370	1.3750	2.750	1.875	1.535	.315	.937	1.23	.386	2.375	1.250	.188	470	590	.452
<b>UWD 16UU</b>	1	1.1870	1.6250	3.250	2.625	1.975	.375	1.188	1.48	.512	2.875	1.750	.218	850	1060	1.010
<b>UWD 20UU</b>	1-1/4	1.5000	2.0000	4.000	3.375	2.485	.437	1.500	1.88	.569	3.500	2.000	.218	1230	1530	1.980
<b>UWD 24UU</b>	1-1/2	1.7500	2.3750	4.750	3.750	2.910	.500	1.750	2.12	.681	4.125	2.500	.281	1480	1850	2.950
<b>UWD 32UU</b>	2	2.1250	3.0000	6.000	4.750	3.660	.625	2.250	2.70	.933	5.250	3.250	.406	2430	3040	5.840

Provided with push in oil fitting for 1/4" to 1/2" sizes. Sizes from 5/8" to 2" offer a 1/4-28 tapped hole with a plug for adding a fitting if desired.



# Unlimited Travel Slides

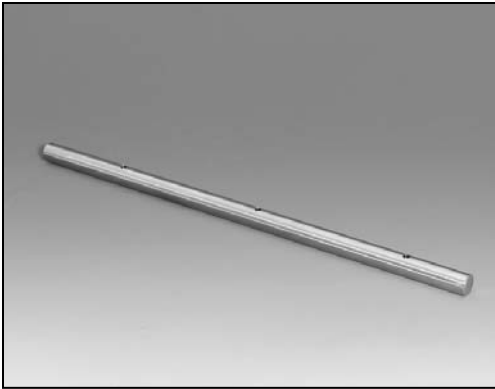
## Shafts

### *Steel Case Hardened and Ground*

MODEL	NOMINAL DIAMETER	TOLERANCE B	WEIGHT PER INCH (lbs)	MIN. DEPTH HARDNESS (inches)	*MAXIMUM LENGTH
FW-4	1/4	.2490 / .2495	.014	.040	96
FW-6	3/8	.3740 / .3745	.031	.040	132
FW-8	1/2	.4990 / .4995	.055	.060	148
FW-10	5/8	.6240 / .6245	.086	.060	144
FW-12	3/4	.7490 / .7495	.125	.060	148
FW-14	7/8	.8740 / .8745	.170	.060	148
FW-16	1	.9990 / .9995	.222	.080	148
FW-18	1-1/8	1.1240 / 1.1245	.281	.080	132
FW-20	1-1/4	1.2490 / 1.2495	.348	.080	148
FW-22	1-3/8	1.3740 / 1.3745	.420	.080	132
FW-24	1-1/2	1.4989 / 1.4994	.500	.080	134
FW-28	1-3/4	1.7490 / 1.7495	.681	.100	132
FW-32	2	1.9987 / 1.9994	.890	.100	138

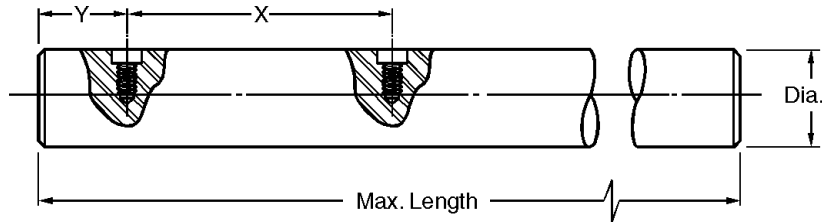
### *440C Stainless Steel*

MODEL	NOMINAL DIAMETER	TOLERANCE B	WEIGHT PER INCH (lbs)	MIN. DEPTH HARDNESS (inches)	*MAXIMUM LENGTH
FW-6SS	3/8	.3740 / .3745	.031	.040	144
FW-8SS	1/2	.4990 / .4995	.055	.060	144
FW-10SS	5/8	.6240 / .6245	.086	.060	144
FW-12SS	3/4	.7490 / .7495	.125	.060	144
FW-16SS	1	.9990 / .9995	.222	.080	144
FW-20SS	1-1/4	1.2490 / 1.2495	.348	.080	144
FW-24SS	1-1/2	1.4989 / 1.4994	.500	.080	144
FW-32SS	2	1.9987 / 1.9994	.890	.100	144



# Unlimited Travel Slides

## Predrilled Shafts



### Pre-Drilled Shafts - Steel Case Hardened and Ground

MODEL	NOM. DIAMETER	DIAMETER TOLERANCE	MAXIMUM LENGTH	"X" HOLE SPACING	TAP SIZE
FW 8 PD	1/2	.4990 / .4995	144 ± 1/32	4	6 - 32
FW 10 PD	5/8	.6240 / .6245	144 ± 1/32	4	8 - 32
FW 12 PD	3/4	.7490 / .7495	144 ± 1/32	6	10 - 32
FW 16 PD	1	.9990 / .9995	144 ± 1/32	6	1/4 - 20
FW 20 PD	1 1/4	1.2490 / 1.2495	144 ± 1/16	6	5/16 - 18
FW 24 PD	1 1/2	1.4989 / 1.4994	132 ± 1/16	8	3/8 - 16
FW 32 PD	2	1.9987 / 1.9994	132 ± 1/16	8	1/2 - 13

*For longer lengths, please inquire at the factory.*

### Pre-Drilled Shafts - 440C Stainless Steel

MODEL	NOM. DIAMETER	DIAMETER TOLERANCE	MAXIMUM LENGTH	"X" HOLE SPACING	TAP SIZE
FW 8 PDSS	1/2	.4990 / .4995	144 ± 1/32	4	6 - 32
FW 10 PDSS	5/8	.6240 / .6245	144 ± 1/32	4	8 - 32
FW 12 PDSS	3/4	.7490 / .7495	144 ± 1/32	6	10 - 32
FW 16 PDSS	1	.9990 / .9995	144 ± 1/32	6	1/4 - 20
FW 20 PDSS	1 1/4	1.2490 / 1.2495	144 ± 1/16	6	5/16 - 18
FW 24 PDSS	1 1/2	1.4989 / 1.4994	132 ± 1/16	8	3/8 - 16
FW 32 PDSS	2	1.9987 / 1.9994	132 ± 1/16	8	1/2 - 13

*For longer lengths, please inquire at the factory.*

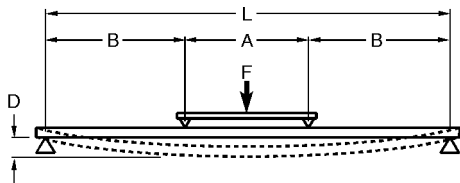
**Note:**

The standard "Y" dimension of in-stock shafts is 1/2 of the "X" dimension, but different first hole locations may be specified when ordering, providing the location is not more than the "X" hole spacing. Holes are drilled and tapped to center of shaft.

## SHAFT DEFLECTION

Shaft Deflection will affect the system's performance. Use the following equation to calculate the maximum shaft deflection (in the center) of a system using Tusk shafting and end supports.

$$D = \frac{F \times B \times [ 3L^2 - 4B^2 ]}{48EI} + \frac{5SL^4}{384EI}$$



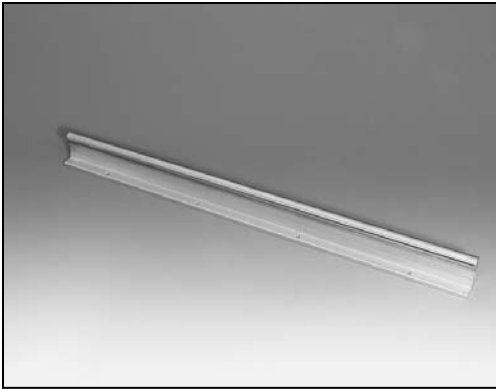
- D = Deflection (in)
- L = Distance between the shaft support (in)
- E = Modulus of Elasticity (lbf/in<sup>2</sup>)
- I = Shafts Moment of inertia (in<sup>4</sup>)
- S = Shaft unit weight (lbf/in)
- F = Load (including carriage weight) (lbf)
- \*A = Distance between the carriage bearings (in)
- B = (L - A) / 2 (in)

### \*Notes:

For shaft deflection of a system using single pillow block with no carriage use the above equation with A = 0.

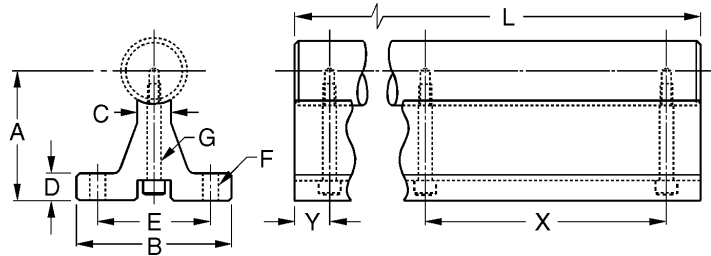
For shaft deflection of systems using double or twin pillow blocks with no carriage use the above equation with A = Distance between the pillow block bearing (see tables).

SHAFT DIAMETER (inches)	EI (lbf/in <sup>2</sup> )	S (lbf/in)
0.250	5.75 x 10 <sup>3</sup>	0.014
0.375	2.91 x 10 <sup>4</sup>	0.031
0.500	9.20 x 10 <sup>4</sup>	.055
0.625	2.25 x 10 <sup>5</sup>	.086
0.750	4.66 x 10 <sup>5</sup>	0.125
0.875	8.63 x 10 <sup>5</sup>	0.170
1.000	1.47 x 10 <sup>6</sup>	.222
1.125	2.36 x 10 <sup>6</sup>	.281
1.250	3.60 x 10 <sup>6</sup>	.348
1.375	5.26 x 10 <sup>6</sup>	.420
1.500	7.46 x 10 <sup>6</sup>	.500
1.750	1.38 x 10 <sup>7</sup>	.681
2.000	2.36 x 10 <sup>7</sup>	0.890
3.000	1.19 x 10 <sup>8</sup>	2.003



# Unlimited Travel Slides

## Rail Shaft Assemblies



Shafting can be provided in steel or 440C. The support rails are manufactured in standard 24" and 48" lengths.

Longer lengths of shafting require the use of multiple rails. Hole spacing will be the standard Pre-Drilled hole pattern associated with that diameter.

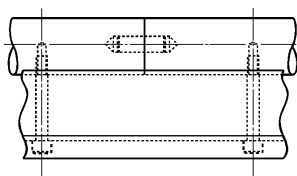
MODEL	NOM. DIA.	A	B	C	D	E	BOLT F HOLE		G THD	Y	X
FWR 8	1/2	1.125	1 1/2	1/4	3/16	1	#6	.169	6-32	2	4
FWR 10	5/8	1.125	1 5/8	5/16	1/4	1 1/8	#8	.193	8-32	2	4
FWR 12	3/4	1.500	1 3/4	3/8	1/4	1 1/4	#10	.221	10-32	3	6
FWR 16	1	1.750	2 1/8	1/2	1/4	1 1/2	1/4	.281	1/4-20	3	6
FWR 20	1 1/4	2.125	2 1/2	9/16	5/16	1 7/8	5/16	.343	5/16-18	3	6
FWR 24	1 1/2	2.500	3	11/16	3/8	2 1/4	5/16	.343	3/8-16	4	8
FWR 32	2	3.250	3 3/4	7/8	1/2	2 3/4	3/8	.406	1/2-13	4	8

Standard "Y" dimensions of in-stock shafts and rails is 1/2 of the "X" dimension, but different first hole locations may be specified, providing that they do not exceed the "X" dimension.

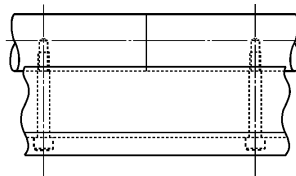
## Stainless Steel

MODEL	NOM. DIA.	A	B	C	D	E	BOLT F HOLE		G THD	Y	X
FWR 8 SS	1/2	1.125	1 1/2	1/4	3/16	1	#6	.169	6-32	2	4
FWR 10 SS	5/8	1.125	1 5/8	5/16	1/4	1 1/8	#8	.193	8-32	2	4
FWR 12 SS	3/4	1.500	1 3/4	3/8	1/4	1 1/4	#10	.221	10-32	3	6
FWR 16 SS	1	1.750	2 1/8	1/2	1/4	1 1/2	1/4	.281	1/4-20	3	6
FWR 20 SS	1 1/4	2.125	2 1/2	9/16	5/16	1 7/8	5/16	.343	5/16-18	3	6
FWR 24 SS	1 1/2	2.500	3	11/16	3/8	2 1/4	5/16	.343	3/8-16	4	8
FWR 32 SS	2	3.250	3 3/4	7/8	1/2	2 3/4	3/8	.406	1/2-13	4	8

## UNLIMITED LENGTHS

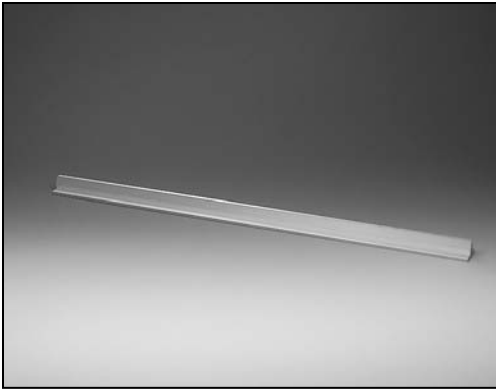


Dowel Joint



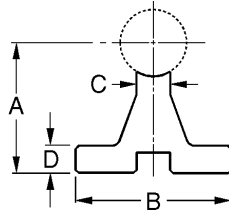
Butt Joint

Assembly shafts can be doweled with a concentricity of .002" or can simply have butted ends to obtain longer lengths. In each case, the mating ends are machined square and there is no chamfer.



# Unlimited Travel Slides

## Aluminum Shaft Supports

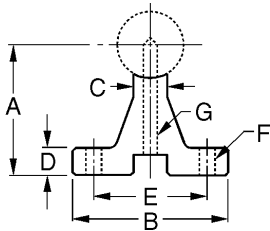


For effective, low cost continuous or intermittent support, extruded aluminum support rails are available in a full range of sizes to accommodate shafts up to 2" diameter (see specification chart below). These rails can be supplied with or without mounting holes and can be used vertically or horizontally to provide optimum rigidity. Available in standard lengths of 24" and 48" + 0", - 1/8" ...which can easily be cut to meet shorter length requirements.

### TYPE R EXTRUDED ALUMINUM SHAFT SUPPORTS

MODEL	NOM. SHAFT DIA.	A ±.002	B	C	D	WT. PER 24" (lbs)
R-8	1/2	1.125	1-1/2	1/4	3/16	1.2
R-10	5/8	1.125	1-5/8	5/16	1/4	1.5
R-12	3/4	1.500	1-3/4	3/8	1/4	2.0
R-16	1	1.750	2-1/8	1/2	1/4	2.6
R-20	1 1/4	2.125	2-1/2	9/16	5/16	3.5
R-24	1 1/2	2.500	3	11/16	3/8	5.1
R-32	2	3.250	3-3/4	7/8	1/2	8.2

### TYPE R-PD SERIES EXTRUDED ALUMINUM SHAFT SUPPORTS WITH PRE-DRILLED HOLES TO MATE WITH TYPE PD SHAFTS

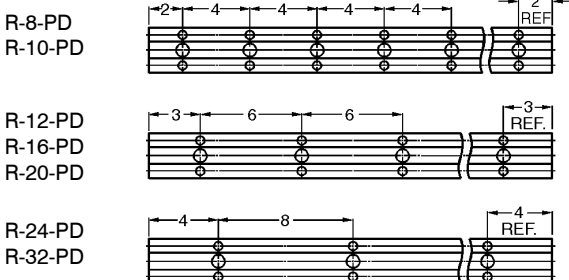


MODEL	NOM. SHAFT DIA.	A ±.002	B	C	D	E	F BOLT	F HOLE	BOLT	G HOLE	WT. PER 24" (lbs)
R-8-PD	1/2	1.125	1-1/2	1/4	3/16	1	#6	.169	6-32 x 7/8	.169	1.2
R-10-PD	5/8	1.125	1-5/8	5/16	1/4	1-1/8	#8	.193	8-32 x 7/8	.193	1.5
R-12-PD	3/4	1.500	1-3/4	3/8	1/4	1-1/4	#10	.221	10-32 x 1-1/4	.221	2.0
R-16-PD	1	1.750	2-1/8	1/2	1/4	1-1/2	1/4	.281	1/4 20 x 1-1/2	.281	2.6
R-20-PD	1 1/4	2.125	2-1/2	9/16	5/16	1-7/8	5/16	.343	5/16-18 x 1 3/4	.343	3.5
R-24-PD	1 1/2	2.500	3	11/16	3/8	2-1/4	5/16	.343	3/8-16 x 2	.406	5.1
R-32-PD	2	3.250	3-3/4	7/8	1/2	2-3/4	3/8	.406	1/2-13 x 2-1/2	.531	8.2

**Note:** Pre-drilled support rails are stocked for immediate delivery in standard 24" and 48" lengths, but can be cut to size. When longer shafts are to be supported, the rails can be continuously mounted end-to-end or intermittently mounted.

#### Mounting Hole Patterns

for various sizes are shown below. The alignment and location of holes are ±.010 non-cumulative.



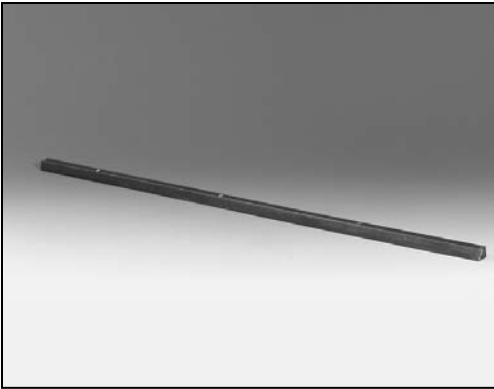
#### How To Order

When ordering standard support rails with mounting holes, order by part number only (for example, R-20-PD, 32"). If a shorter length is required, specify part number and exact length. For example, R-20-PD, 18" long. We provide a cutting service at a slight additional charge.

We can supply shafts and supports as complete assemblies in any length. When ordering, please specify the shaft diameter and overall length, and we will assemble using standard pre-drilled shafts and supports. For hole spacing other than the standard patterns shown above, please send drawings with your request for a quotation.

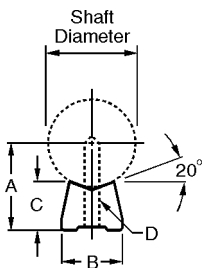
# Unlimited Travel Slides

## Low Profile Support Rails

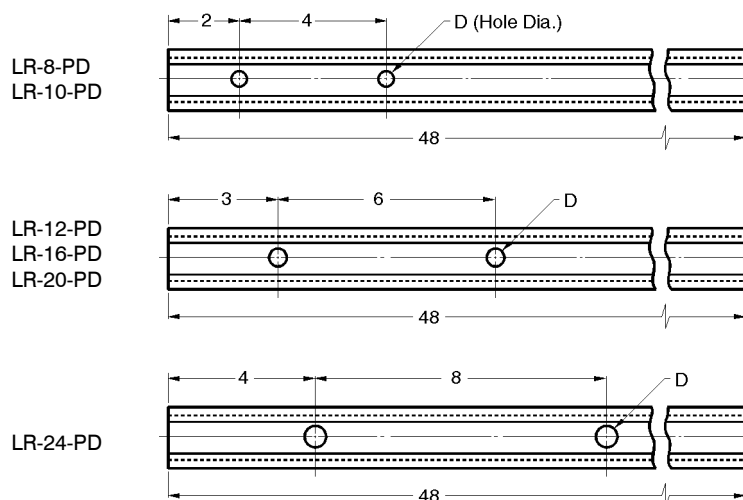


Low shaft support rails permit the design of compact linear motion systems with more than a 40% lower profile. The low shaft support rails are made of AISI C-1018 steel. Continuous or intermittent support is permissible when using open-type linear recirculating ball

bearing pillow blocks. LR-PD rails have pre-drilled mounting holes to match the pre-drilled and tapped holes in the PD series shafts. Standard length for all low shaft rails is 48".



MODEL	SHAFT DIA.	A ±.002	B ±.005	C	D		HOLE SPACING FOR LSR-PD		APPROX. WT. IN LBS. PER 48"
					BOLT	HOLE	Y	X	
LR-8 LR-8-PD	.500	.562	.370	.341	6-32	.169	2	4	1.32
LR-10 LR-10-PD	.625	.687	.450	.412	8-32	.193	2	4	1.95
LR-12 LR-12-PD	.750	.750	.510	.420	10-32	.221	3	6	2.25
LR-16 LR-16-PD	1.000	1.000	.690	.560	1/4-20	.281	3	6	4.25
LR-20 LR-20-PD	1.250	1.187	.780	.626	5/16-18	.343	3	6	5.08
LR-24 LR-24-PD	1.500	1.375	.930	.703	3/8-16	.406	4	8	6.72







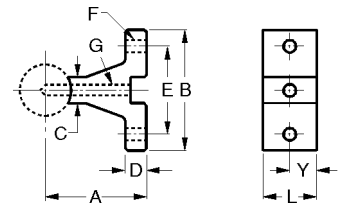
# Unlimited Travel Slides

## Intermittent Support Rails

### INTERMITTENT SUPPORT RAILS RS 1

The RS 1 supports are for those applications not requiring continuous support.

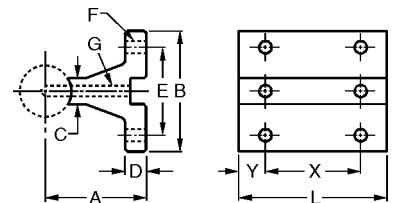
MODEL	SHAFT DIA.	A	B	C	D	E	F	G	Y	L
RS1-8	1/2	1.125	1-1/2	1/4	3/16	1	#6	6-32	1	2
RS1-10	5/8	1.125	1-5/8	5/16	1/4	1-1/8	#8	8-32	1	2
RS1-12	3/4	1.500	1-3/4	3/8	1/4	1-1/4	#10	10-32	1-1/2	3
RS1-16	1	1.750	2-1/8	1/2	1/4	1-1/2	1/4	1/4-20	1-1/2	3
RS1-20	1 1/4	2.125	2-1/2	9/16	5/16	1-7/8	5/16	5/16-18	1-1/2	3
RS1-24	1 1/2	2.500	3	11/16	3/8	2-1/4	5/16	3/8-16	2	4
RS1-32	2	3.250	3-3/4	7/8	1/2	2-3/4	3/8	1/2-13	2	4



### INTERMITTENT SUPPORT RAILS RS 2

The RS 2 intermittent rails are ideal for support below joints in shafting.

MODEL	SHAFT DIA.	A	B	C	D	E	F	G	Y	X	L
RS2-8	1/2	1.125	1-1/2	1/4	3/16	1	#6	6-32	1	4	6
RS2-10	5/8	1.125	1-5/8	5/16	1/4	1-1/8	#8	8-32	1	4	6
RS2-12	3/4	1.500	1-3/4	3/8	1/4	1-1/4	#10	10-32	1	6	8
RS2-16	1	1.750	2-1/8	1/2	1/4	1-1/2	1/4	1/4-20	1	6	8
RS2-20	1 1/4	2.125	2-1/2	9/16	5/16	1-7/8	5/16	5/16-18	1	6	8
RS2-24	1 1/2	2.500	3	11/16	3/8	2-1/4	5/16	3/8-16	1-1/2	8	11
RS2-32	2	3.250	3-3/4	7/8	1/2	2-3/4	3/8	1/2-13	1-1/2	8	11





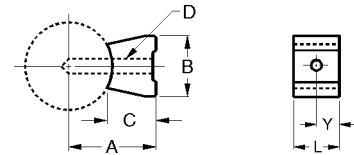
# Unlimited Travel Slides

## Intermittent Low Shaft Support Rails

### INTERMITTENT LOW SHAFT SUPPORT RAILS LRS 1

The LRS 1 supports are for those applications not requiring continuous support.

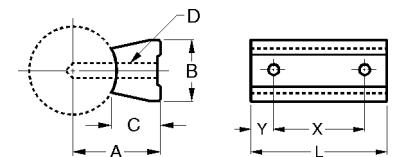
MODEL	SHAFT DIA.	A	B	C	BOLT	D	HOLE	Y	L
LRS 1-8	1/2	.562	.370	.341	6-32		.169	1	2
LRS 1-10	5/8	.687	.450	.412	8-32		.193	1	2
LRS 1-12	3/4	.750	.510	.420	10-32		.221	1-1/2	3
LRS 1-16	1	1.000	.690	.560	1/4-20		.281	1-1/2	3
LRS 1-20	1 1/4	1.187	.780	.626	5/16-18		.343	1-1/2	3
LRS 1-24	1 1/2	1.375	.930	.703	3/8-16		.406	2	4
LRS 1-32	2	1.750	1.180	.845	1/2-13		.531	2	4



### INTERMITTENT LOW SHAFT SUPPORT RAILS LRS 2

The LRS 2 Intermittent support rails are ideal for support below joints in shafting.

MODEL	SHAFT DIA.	A	B	C	BOLT	D	HOLE	Y	X	L
LRS 2-8	1/2	.562	.370	.341	6-32		.169	1	4	6
LRS 2-10	5/8	.687	.450	.412	8-32		.193	1	4	6
LRS 2-12	3/4	.750	.510	.420	10-32		.221	1	6	8
LRS 2-16	1	1.000	.690	.560	1/4-20		.281	1	6	8
LRS 2-20	1 1/4	1.187	.780	.626	5/16-18		.343	1	6	8
LRS 2-24	1 1/2	1.375	.930	.703	3/8-16		.406	1-1/2	8	11
LRS 2-32	2	1.750	1.180	.845	1/2-13		.531	1-1/2	8	11

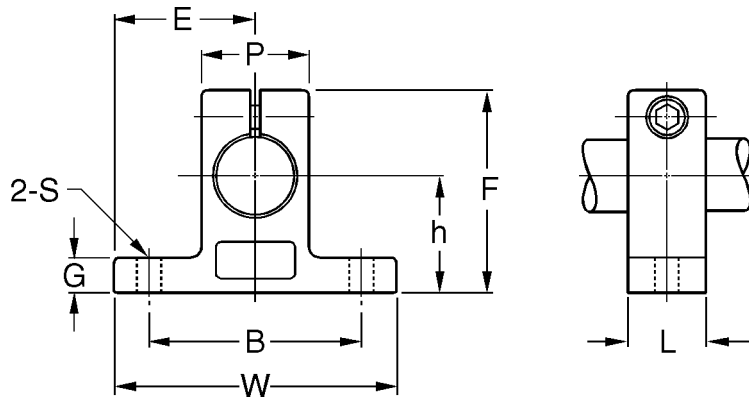


The length tolerance of Intermittent support rails is  $+0.000'' / -.125''$



# Unlimited Travel Slides

## H-A Shaft Hangers



Nominal Shaft Diam. inch/mm	Part No.	Major Dimensions (inch/mm)										Weight g
		h ±.001 ±0.02	E ±.005 ±0.1	W	L	F	G	P	B ±.01 ±0.2	S	BOLT	
1/4 6.350	H 4A	.6875 17.463	.7500 19.050	1.500 38.10	.500 12.70	1.063 27.00	.250 6.35	.500 12.70	1.125 28.58	.156 4.0	#6	15
3/8 9.525	H 6A	.7500 19.050	.8125 20.637	1.625 41.28	.563 14.30	1.187 30.16	.250 6.35	.688 17.46	1.250 31.75	.156 4.0	#6	21
1/2 12.700	H 8A	1.0000 25.400	1.0000 25.400	2.000 50.80	.625 15.88	1.625 41.28	.250 6.35	.875 22.23	1.500 38.10	.188 4.8	#8	35
5/8 15.875	H 10A	1.0000 25.400	1.2500 31.750	2.500 63.50	.688 17.46	1.750 44.45	.313 7.94	1.000 25.40	1.875 47.63	.218 5.6	#10	52
3/4 19.050	H 12A	1.2500 31.750	1.5315 38.900	2.500 63.50	.750 19.05	2.063 52.40	.313 7.94	1.250 31.75	2.000 50.80	.218 5.6	#10	74
1 25.400	H 16A	1.5000 38.100	1.8750 47.625	3.063 77.80	1.000 25.40	2.500 63.50	.375 9.53	1.500 38.10	2.500 63.50	.281 7.2	1/4	136
1-1/4 31.750	H 20A	1.7500 44.450	2.1875 47.625	3.750 95.25	1.125 28.58	3.000 76.20	.438 11.14	2.000 50.80	3.000 76.20	.346 8.8	5/16	254
1-1/2 38.100	H 24A	2.0000 50.800	2.1875 55.550	4.375 111.13	1.250 31.75	3.437 87.30	.500 12.70	2.250 57.15	3.500 88.90	.346 8.8	5/16	340
2 50.800	H 32A	2.5000 63.500	2.7500 69.850	5.500 139.70	1.500 38.10	4.375 111.13	.625 15.88	3.000 76.20	4.500 114.30	.406 10.5	3/8	670

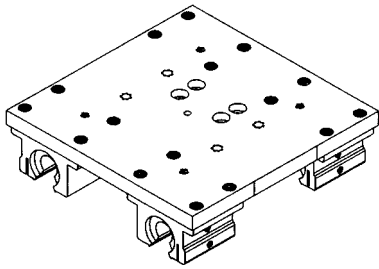
1kg = 2.205 lbs

# Unlimited Travel Slides

## Linear Bearing Assemblies



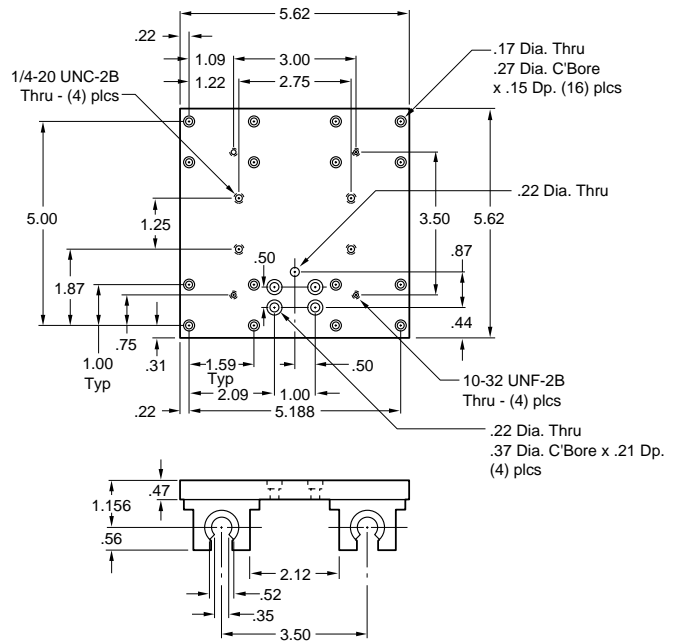
### Carriage



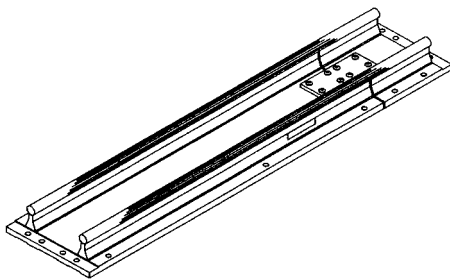
These carriage tops are available with self-aligning recirculating ball bearings. The bearings are prealigned for ease of installation.

#### Material

- Table Top:** Aluminum Black Anodized
- Housing:** Aluminum Black Anodized
- Bearing:** Self Aligning Recirculating Ball



### Base

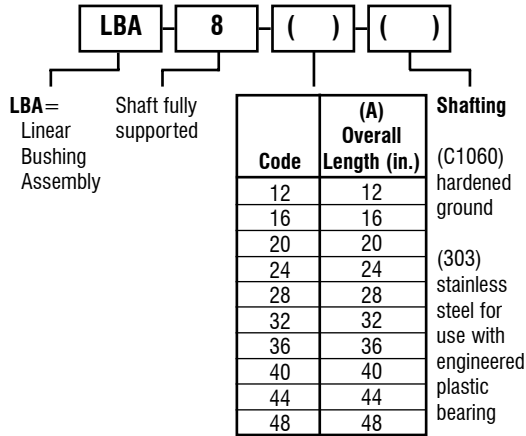


1/2" diameter shafting is continuously supported to eliminate deflection. Units may be joined to create longer lengths.

#### Specifications

- Flatness:**  $\pm .0002$  in./in.
- Straightness:**  $\pm .0002$  in./in.
- Material:** — Aluminum base; black anodize
- Shafting:** — C-1060 steel hardened & ground shafting or 303 stainless steel

## Ordering Information



### Model LBA-8-12 through 24 One Piece Construction

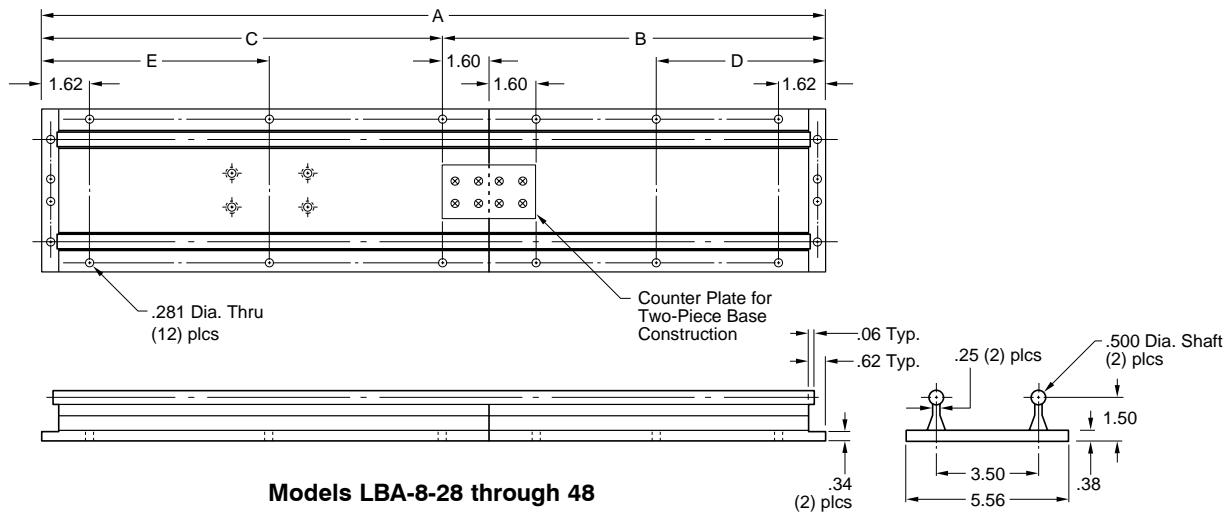
Part Number	A Inches	E Inches
LBA-8-12	12.00	6.00
LBA-8-16	16.00	8.00
LBA-8-20	20.00	10.00
LBA-8-24	24.00	12.00

### Model LBA-8-28 through 48 Two Piece Construction

Part Number	A Inches	B Inches	C Inches	D Inches	E Inches
LBA-8-28	*28.00	11.98	15.98	6.00	8.00
LBA-8-32	32.00	15.98	15.98	8.00	8.00
LBA-8-36	36.00	15.98	19.98	8.00	10.00
LBA-8-40	40.00	19.98	19.98	10.00	10.00
LBA-8-44	44.00	19.98	23.98	10.00	12.00
LBA-8-48	48.00	23.98	23.98	12.00	12.00

\*LBA-8-28 is also available in a single 28 inch version.

## Dimensions





**TUSK** *DIRECT, INC.*

## **Ceramic / Teflon<sup>®</sup> Plane Bearings**

Tusk ceramic coated and Teflon<sup>®</sup>-lined plane bearings and assemblies provide a solution to engineers designing equipment for challenging environments. The bearings are designed to replace standard ball type bushings. They are drop in replacements with identical retaining ring groove locations and outer and inner diameters and offered in straight and self-aligning configurations. They are compatible with hard or soft steel or stainless steel shafting and solve the problems posed by harsh chemicals, abrasives, wash down requirements, and areas in which lubrication is not possible or desired. Applications in which there is combined linear and rotary motion, rapid oscillation, short travels and shock impact and vibration are no problem for Tusk plane bearings and assemblies. They operate over a wide temperature range; have high load capacity and low friction. They are offered as unmounted bearings and in pillow block assemblies in single, twin and flange block types. They work well with Tusk shafting and shaft assemblies.



### **Teflon<sup>®</sup>-Lined Plane Bearings**

Ideal for combined linear and rotary motion applications Tusk Teflon<sup>®</sup>-lined plane bearings are resistant to a wide range of chemicals, can be washed down and provide smooth, quiet operation. They require no lubrication and are contamination resistant.

### **Stainless Steel Teflon<sup>®</sup>- Lined Plane Bearings**

A stainless steel outer shell with a bonded Teflon<sup>®</sup> composite inner surface makes these bearings ideal for applications requiring FDA and or USDA compliance. Processing applications in the food and pharmaceutical industries and associated packaging machinery will benefit from the smooth quiet operation requiring no lubrication, easy wash down and resistance to contamination. The bearings are compatible with 300 series stainless shafting.

### **Ceramic Coated Plane Bearings**

An alternative solution for applications in which ball type recirculating bushings are not suitable. Ceramic-coated bearings can withstand rapid oscillation, impact shock and vibration, submersion and wash down. They are useful in vacuum applications and have no particulate release. Ceramic-coated bearings must be lubricated and work well with vacuum compatible lubricants. They are resistant to a wide range of chemicals. Shafting must be RC35 or higher.

*Teflon<sup>®</sup> is a registered trademark of Dupont Corporation.*

Specifications / Capabilities

Specs	Teflon <sup>®</sup> Lined (TL)	Ceramic Bearing (C)	Stainless Steel Teflon <sup>®</sup> Lined (SSTL)
Max PV (continuous)	30,000	40,000	10,000
Max P-PSI (static)	5,000	5,000	1,000
Max V SFM (no load)	400	Unlimited!	400
Shaft Hardness (minimum)	RB 25	RC 35	RB 25
Shaft Finish (RMS)	8-16	8-16	8-16
Coefficient of Friction	.09-.12	.04-.08	.12-.20
Temperature Limits typical range	-400 TO + 375 F	-200 to + 400F	-400 to +375F

HIGHLOADS		DEBRIS	SHOCK / VIBRATION	WASHDOWN	CHEMICALS	LUBRICATION	SHAFTING
(TL) Teflon <sup>®</sup> Lined	YES	YES	YES	YES	*YES	Not Required	Soft RB25
(C) Ceramic	YES	YES	YES	YES	*YES	Required	Hard RC335
(SSTL) Stainless Steel Teflon <sup>®</sup> Lined	NO	NO	YES	YES	*YES	Not Required	Soft RB25

**NOTES:**

\*See chemicals resistance chart page

CTL and SSTL bearings run successfully on soft 300 series stainless steel shafting as well as hardened shafting. Ceramic Coated bearings require hardened shafting RC35 or better.

All bearings provide quiet, smooth and vibration free operation.

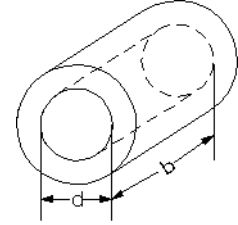
# Engineering Information

## PV (Pressure Velocity)

PV is the unit of measure determined by 2 factors : Pressure (PSI) and Velocity (SFM)

### Formula: $P = W/(dxb)$

W= Static Load on a Single Bearing  
d=Bearing Inside Diameter  
b=Bearing Length



Example: 225lb. load applied to a 1-inch inside diameter bearing x 2-1/4 inches long.

Note: Determining PSI: ID X Length

$P=225/(1" \times 2.25")$  or  $P= 100$  PSI and the velocity is 50 feet per minute

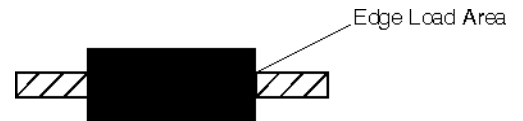
$P_v=100$  (PSI) X 50 feet per minute

Answer:  $PV = 5000$

## PARALLEL SHAFTING

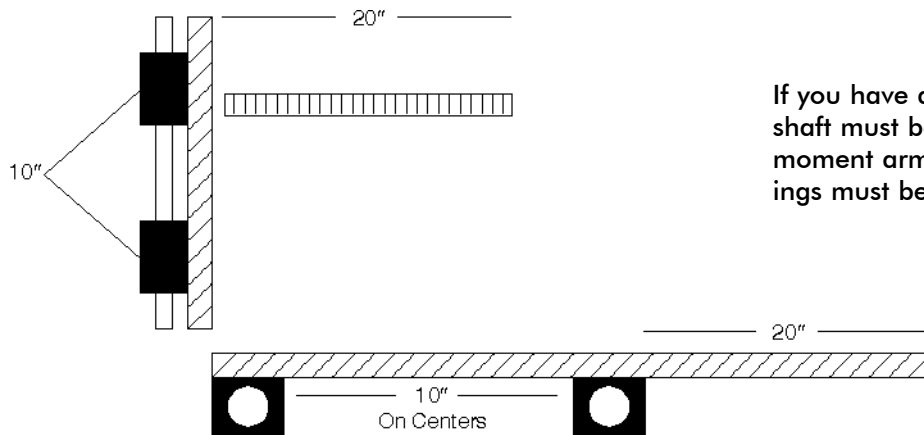
Sleeve-type linear motion bearings, more so than ball bushings, require parallel shafting to be aligned as closely as possible to avoid edge loading. Edge loading can cause higher than expected friction and subsequent wear. Speak with a Tusk engineer should you have application questions.

To combat shaft misalignment, Tusk Offers 2 options:



1. Self-aligning bearings: A subtle OD radius allows the bearing to pivot on the bearing crown.
2. Bearings can be supplied with self-aligning o-rings to provide for a "full float bearing." Unlike our self-aligning bearings, floating bearings on o-rings result in changes between shaft centerline to housing tolerances due to deflection and possible mechanical sets.

## Overhung Loads



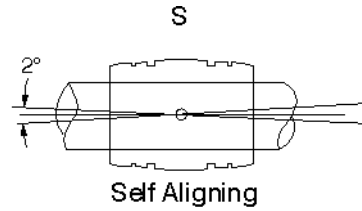
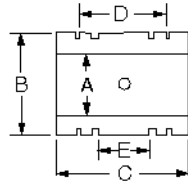
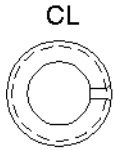
If you have an overhung load, bearings on a single shaft must be a minimum of 1/2 the length of the moment arm. If a moment arm is 20" in length, bearings must be 10" apart to avoid binding.

## One Piece Constructions

Tusk can design a one piece unit which serves as both housing and bearing. This process eliminates tolerance stack-up, individual component purchases. Save on assembly time. Save on purchased components!



# Dimensions & Specifications



Inch Series

Available in Ceramic, Teflon<sup>®</sup> Lined and Self Aligning styles

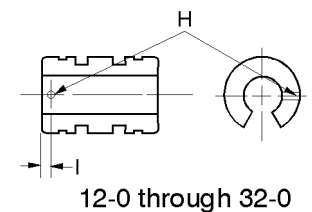
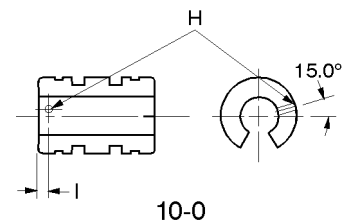
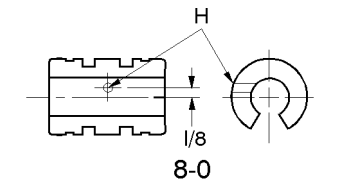
Bearing Number (L OR LX)	Working Bore		Outside Diameter		Length		Distance Between Retaining Rings D	Distance Between O-Ring Grooves E	Slot Width +.020 -.000 F	Retaining Hole Diameter H	Hole Location To BRG. End I
	Inches A	TOL. -.0000 +	Inches B	TOL. +.0000 -	Inches C	TOL. +.000 -					
4	0.2505	0.0010	0.5000	0.0010	0.750	0.015	0.437	0.018	0.094	0.094	on center
6	0.3755	0.0010	0.6250	0.0010	0.875	0.015	0.562	0.260	0.156	0.094	on center
6L	0.3755	0.0010	0.6250	0.0010	0.875	0.015	0.625	0.260	0.156	0.094	on center
8	0.5005	0.0010	0.8750	0.0010	1.250	0.015	0.875	0.490	0.312	0.133	5/8
8L	0.5005	0.0010	0.8750	0.0010	1.250	0.015	0.940	0.490	0.312	0.133	5/8
10	0.6255	0.0010	1.1250	0.0010	1.500	0.015	1.000	0.550	0.375	0.133	1/8
12	0.7508	0.0010	1.2500	0.0010	1.625	0.015	1.062	0.612	0.438	0.133	1/8
12L	0.7508	0.0010	1.2500	0.0010	1.625	0.015	1.160	0.612	0.438	0.133	1/8
16	1.0008	0.0010	1.5265	0.0010	2.250	0.015	1.625	1.180	0.563	0.133	1/8
16L	1.0008	0.0010	1.5625	0.0010	2.250	0.015	1.750	1.180	0.563	0.133	1/8
20	1.2508	0.0010	2.0000	0.0010	2.625	0.020	1.875	1.425	0.625	0.201	3/16
24	1.5008	0.0015	2.3750	0.0015	3.000	0.020	2.250	1.670	0.750	0.201	3/16
32	2.0012	0.0015	3.0000	0.0015	4.000	0.020	3.000	1.450	1.000	0.275	5/16

Available with or without seals.

## Retaining Pin Location

### O Series Bearing

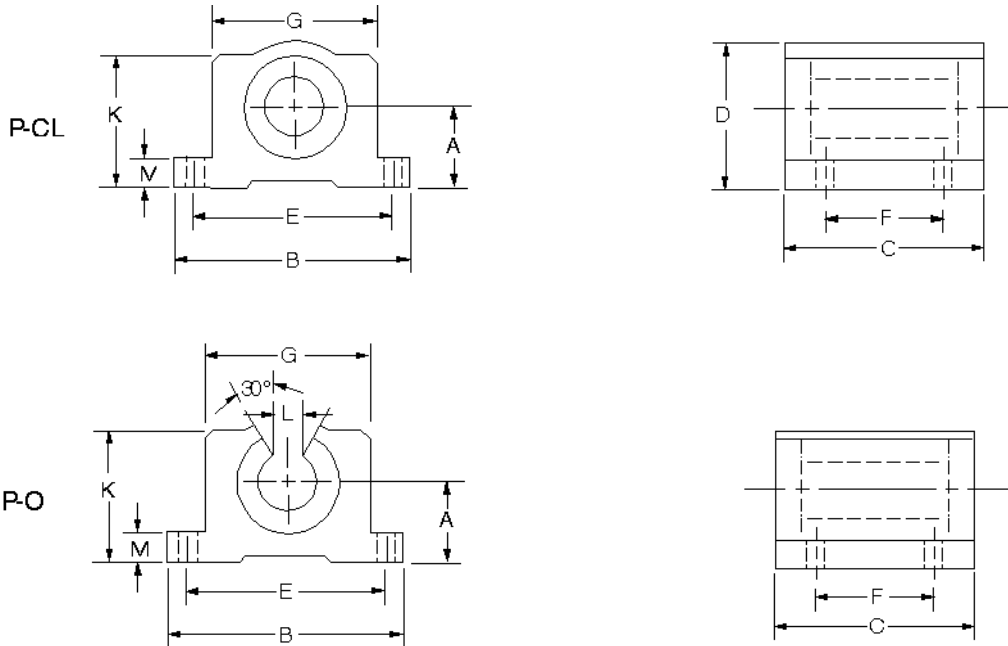
Bearing Number	Max. Shaft Dia.	Housing Bore		Bearing Weight Lbs.(L)	Bearing Weight Lbs.(LX)	Max Static Load Lbs.
		Tol. -.0000 +				
4	0.2495	0.5000	0.0005	0.010	0.008	939
6	0.3745	0.6250	0.0005	0.015	0.013	1643
6L	0.3745	0.6250	0.0005	0.015	0.013	1643
8	0.4995	0.8750	0.0005	0.046	0.034	3128
8L	0.4995	0.8750	0.0005	0.046	0.034	3128
10	0.6245	1.1250	0.0005	0.096	0.072	4691
12	0.7495	1.2500	0.0005	0.125	0.091	6100
12L	0.7495	1.2500	0.0005	0.125	0.091	6100
16	0.9995	1.5625	0.0005	0.247	0.184	11259
16L	0.9995	1.5625	0.0005	0.247	0.184	11259
20	1.2495	2.0000	0.0010	0.500	0.381	16417
24	1.4994	2.3750	0.0010	0.780	0.603	22512
32	1.9994	3.0000	0.0010	1.540	1.190	40024



Tusk bearings can be press fit, held in place with snap rings or pinned in housing with a retaining pin. Retaining pin location is illustrated above.

Note: Oil hole centrally located on the "C" dimension on all standard bearings.

# Pillow Block Dimensions Specifications



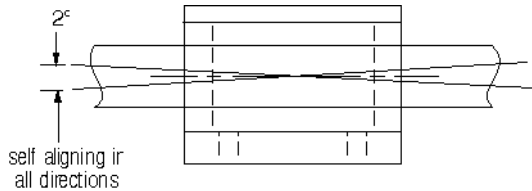
## Inch Series

Available in Ceramic, Teflon® Lined and Self Aligning Styles

Part Number (L) (LX)	Shaft Dia.		A +/- .003	B	C	D	E +/- .010	F +/- .010	G	Bolt/ Hole	K	L	M
	Nom.	Max.										Min.	Min.
4-P	1/4	.2495	.437	1 5/8	1 3/16	13/16	1.312	.750	1	#6-5/32	3/4	3/32	3/16
6-P	3/8	.3745	.500	1 3/4	1 5/16	15/16	1.437	.875	1 1/8	#6-5/32	7/8	9/64	3/16
8-P	1/2	.4995	.687	2	1 11/16	1 1/4	1.688	1.000	1 3/8	#6-5/32	1 1/8	5/16	1/4
10-P	5/8	.6245	.875	2 1/2	1 15-16	1 5/8	2.125	1.125	1 3/4	#8-3/16	1 7/16	3/8	9/32
12-P	3/4	.7495	.937	2 3/4	2 1/16	1 3/4	2.375	1.250	1 7/8	#8-3/16	1 9/16	7/16	5/16
16-P	1	.9995	1.187	3 1/4	2 13/16	2 3/16	2.875	1.750	2 3/8	#10-7/32	2	9/16	3/8
20-P	1 1/4	1.2495	1.500	4	3 5/8	2 13/16	3.500	2.000	3	#10-7/32	2 1/2	5/8	7/16
24-P	1 1/2	1.4994	1.750	4 3/4	4	3 1/4	4.125	2.500	3 1/2	1/4-9/32	2 7/8	3/4	1/2
32-P	2	1.9994	2.125	6	5	4 1/16	5.250	3.250	4 1/2	3/8-13/32	3 5/8	1	5/8

Complete pillow block units include bearing, grease fitting, retention pin and seals.

Self lubricated pillow blocks normally supplied without seals unless requested.



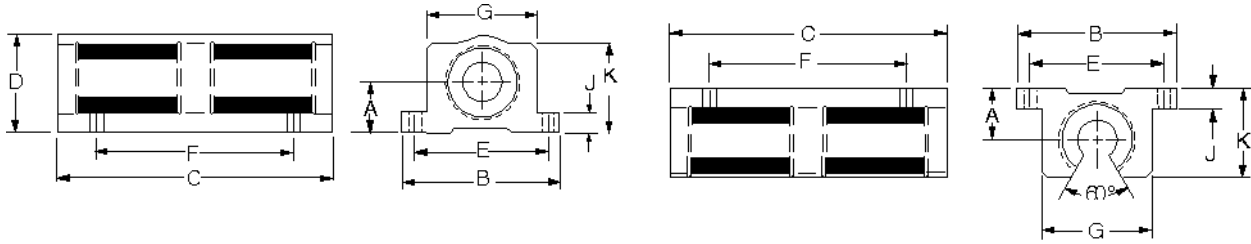
Self aligning pillow blocks allow 360° misalignment of 1° from shaft centerline, 2° total misalignment for applications where proper alignment is difficult or self alignment desirable.

## Pillow Block Housing

PART NUMBER	
PREFIXES	Housing Bore
4-P	.5000/.5005
6-P	.6250/.6255
8-P	.8750/.8755
10-P	1.1250/1.1255
12-P	1.2500/1.2505
16-P	1.5625/1.5635
20-P	2.0000/2.0010
24-P	2.3750/2.3760
32-P	3.0000/3.0010

# Tusk Twin Pillow Blocks

## Dimensions & Specifications



Closed (CL) and open (O)

Available in Ceramic and Teflon<sup>®</sup> Lined

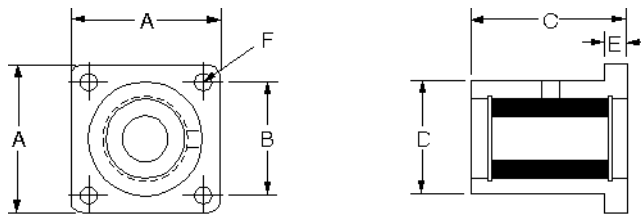
Part Number	Working Bore		A +/- .002	B	C	D	E +/- .010	F +/- .010	G	Bolt	Hole	J Min.	K
	Inches	Tolerance											
4-T	.2505	+.001	.437	1 5/8	2 1/2	13/16	1.312	2.000	1	#6	5/32	3/16	3/4
6-T	.3755	+.001	.500	1 3/4	2 3/4	15/16	1.437	2.250	1 1/8	#6	5/32	3/16	7/8
8-T	.5005	+.001	.687	2	3 1/2	1 1/4	1.688	2.500	1 3/8	#6	5/32	1/4	1 1/8
10-T	.6255	+.001	.875	2 1/2	4	1 5/8	2.125	3.000	1 3/4	#8	3/16	9/32	1 7/16
12-T	.7505	+.001	.937	2 3/4	4 1/2	1 3/4	2.375	3.500	1 7/8	#8	3/16	5/16	1 9/16
16-T	1.0008	+.001	1.187	3 1/4	6	2 3/16	2.875	4.500	2 3/8	#10	7/32	3/8	1 15/16
20-T	1.2508	+.001	1.500	4	7 1/2	2 13/16	3.500	5.500	3	#10	7/32	7/16	2 1/2
24-T	1.5008	+.0015	1.750	4 3/4	9	3 1/4	4.125	6.500	3 1/2	1/4	9/32	1/2	2 7/8
32-T	2.0012	+.0015	2.125	6	10	4.063	5.250	8.250	4.500	3/8	13/32	5/8	3.625

Ceramic blocks supplied with seals and a grease fitting. Teflon<sup>®</sup> Lined series normally supplied without seals unless requested. Twin pillow blocks are not available with self aligning bearings.

### ADVANTAGES:

Available Ceramic coated or in the Teflon<sup>®</sup> Lined series. Interchangeable with standard twin ball bushing pillow blocks.

## Flanged Blocks



Available in Ceramic, Teflon<sup>®</sup> Lined and Self Aligning Styles

Part Number	Shaft Diameter		A	B +/- .010	C	D	E	F	
	Nom.	Max.						Bolt	Hole
8-F	1/2"	0.4995	1 5/8	1.250	1 11/16	1 1/4	1/4	#8	3/16"
12-F	3/4"	0.7495	2 3/8	1.750	2 1/16	1 3/4	3/8	#10	7/32"
16-F	1"	0.9995	2 3/4	2.125	2 13/16	2 1/4	1/2	1/4"	9/32"

### ADVANTAGES:

Fully interchangeable with standard ball bushing flange blocks. Ceramic series supplied with seals and grease fitting. Teflon<sup>®</sup> Lined series supplied without seals, unless specified.

## CERAMIC COATED (C TYPE) BEARINGS

The data shown below is based on laboratory tests and actual service records. Because factors such as turbulence, temperature, PV, degree of contact, etc. are variables which can affect performance, it is always advisable to test the material under service conditions before specifying for new applications. If this is impractical, a test should be devised to simulate service conditions as closely as possible. For advice, consult factory.

A - Fluid has little or no effect

B - Fluid has minor to moderate effect

C - Fluid has severe effect

Unless otherwise noted, concentrations or aqueous solutions are saturated. All ratings are at room temperature unless specified. **Should the coating wear through to the aluminum substrate, this chart is no longer applicable.**

### Chemical

Acetaldehyde	.A
Acetic acid, 20%	.A
Acetic acid, 30%	.A
Acetic acid, glacial	.A
Acetic anhydride	.A
Acetone	.A
Acetylene	.A
Aluminum chloride solutions	.B
Aluminum sulfate solutions	.A
Ammonia, anhydrous	.A
Ammonium hydroxide solutions	.C
Ammonium chloride solutions	.C
Ammonium sulfate solutions	.B
Amyl acetate	.A (122°F) (50°C)
Amyl alcohol	.A
Aniline	.A
ASTM oil #1	.A (158°F) (70°C)
ASTM oil #3	.A (158°F) (70°C)
ASTM reference fuel A	.A
ASTM reference fuel B	.A (122°F) (50°C)
ASTM reference fuel C	.A
Asphalt	.A
Barium hydroxide solutions	.C
Beer	.A
Benzaldehyde	.A
Benzene	.A (158°F) (70°C)
Benzoyl chloride anhydrous	.A
Benzoyl chloride boiling	.C
Borax solutions	.A (to 176°)
Boric acid solutions	.A
Bromine, anhydrous liquid	.A
Butane	.A
Butyl acetate	.A
Butyraldehyde	.A
Butyric acid	.A
Calcium bisulfite solutions	.B
Calcium chloride solutions	.C
Calcium hydroxide solutions	.B
Calcium hypochlorite, 5%	.B
Calcium hypochlorite, 20%	.B
Carbon bisulfide	.A
Carbon dioxide	.A
Carbon monoxide	.A
Carbon tetrachloride, dry	.A (122°F) (50°C)
Carbon tetrachloride, wet	.B
Castor oil	.A
Chlorine gas, dry	.A
Chlorine gas, wet	.C
Chlorosulfonic acid	.A
Chromic acid, 10-15%	.B
Citric acid solutions	.A
Copper chloride solutions	.B
Copper sulfate solutions	.B
Cottonseed oil	.A
Creosote oil	.A
Cyclohexane	.A

### Chemical

Ethyl acetate	.A (122°) (50°C)
Ethyl alcohol	.A
Ethyl chloride, dry	.A
Ethyl glycol	.A
Ferric chloride solutions	.C
Formaldehyde	.A
Formic acid	.A
FREON-11	.A
FREON-11	.A (130°F) (54°C)
FREON-12	.A
FREON-12	.A (130°F) (54°C)
FREON-22	.A
FREON-22	.A (130°F) (54°C)
FREON-113	.A
FREON-113	.A (130°F) (54°C)
FREON-114	.A
FREON-114	.A (130°F) (54°C)
Furfural	.A
Gasoline	.A
Glue	.A
Glycerin	.A
n-Hexane	.A (122°F) (50°C)
Hydrazine	.A
Hydrochloric acid, 20%	.B
Hydrochloric acid, 37%	.B
Hydrocyanic acid	.C
Hydrofluoric acid, 48%	.C
Hydrofluoric acid, 75%	.C
Hydrofluoric acid, anhydrous	.C
Hydrogen	.A
Hydrogen peroxide, 90%	.A
Hydrogen sulfide	.A
JP-4	.A
JP-5	.A
JP-6	.A
Kerosene	.A
Lacquer solvents	.A
Lactic acid	.A
Linseed oil	.A
Lubricating oils	.A
Magnesium chloride solutions	.B
Mercuric chloride solutions	.C
Mercury	.C
Methyl alcohol	.A
Methyl ethyl ketone	.A (122°F) (50°C)
Methylene chloride	.B
Mineral oil	.A
Naptha	.A
Nathalene	.A
Nitric acid, 10%	.A
Nitric acid, 30%	.A
Nitric acid, 60%	.A
Nitric acid, 70%	.A
Nitric acid, red fuming	.A
Nitrobenzene	.A
Oleic acid	.A

### Chemical

Palmitic acid	.A
Perchloroethylene	.A
Phenol	.A
Phosphoric acid, 20%	.C
Phosphoric acid, 60%	.C
Phosphoric acid, 70%	.C
Phosphoric acid, 85%	.C
Pickling solution (20% nitric acid, 4% HF)	.B
Pickling solution (17% nitric acid, 4% HF)	.B
Potassium dichromate solutions	.A
Potassium hydroxide solutions	.C
Pyridine	.A
SAE #10 oil	.A (158°F) (70°C)
Sea Water	.A
Silicone grease	.A
Soap solutions	.A
Sodium chloride solutions	.A
Sodium dichromate, 20%	.A
Sodium hydroxide, 20%	.C
Sodium hydroxide, 46 <sup>1/2</sup> %	.C
Sodium hydroxide, 50%	.C
Sodium hydroxide, 73%	.C
Sodium hypochlorite, 5%	.C
Sodium hypochlorite, 20%	.C
Sodium peroxide solutions	.A
Soybean oil	.A
Steam (see water)	.A
Stearic acid	.A
Styrene	.A
Sulfur, molten	.A
Sulfur dioxide, liquid	.C
Sulfur dioxide, gas	.C
Sulfur trioxide	.C
Sulfuric acid, up to 50%	.C
Sulfuric acid, 50%-80%	.C
Sulfuric acid, 60%	.C
Sulfuric acid, 90%	.C
Sulfuric acid, 95%	.C
Sulfuric acid, fuming (20% oleum)	.C
Sulfurous acid	.B
Tannic acid, 10%	.A
Tartaric acid	.A
Toluene	.A (122°F) (50°C)
Trichloroethylene	.A
Tricresyl phosphate	.A
Triethanolamene	.A
Tung oil	.A
Turpentine	.A
Water	.A (122°F) (50°C)
Water	.A (212°F) (100°C)
Xylene	.A
Zinc chloride solutions	.B

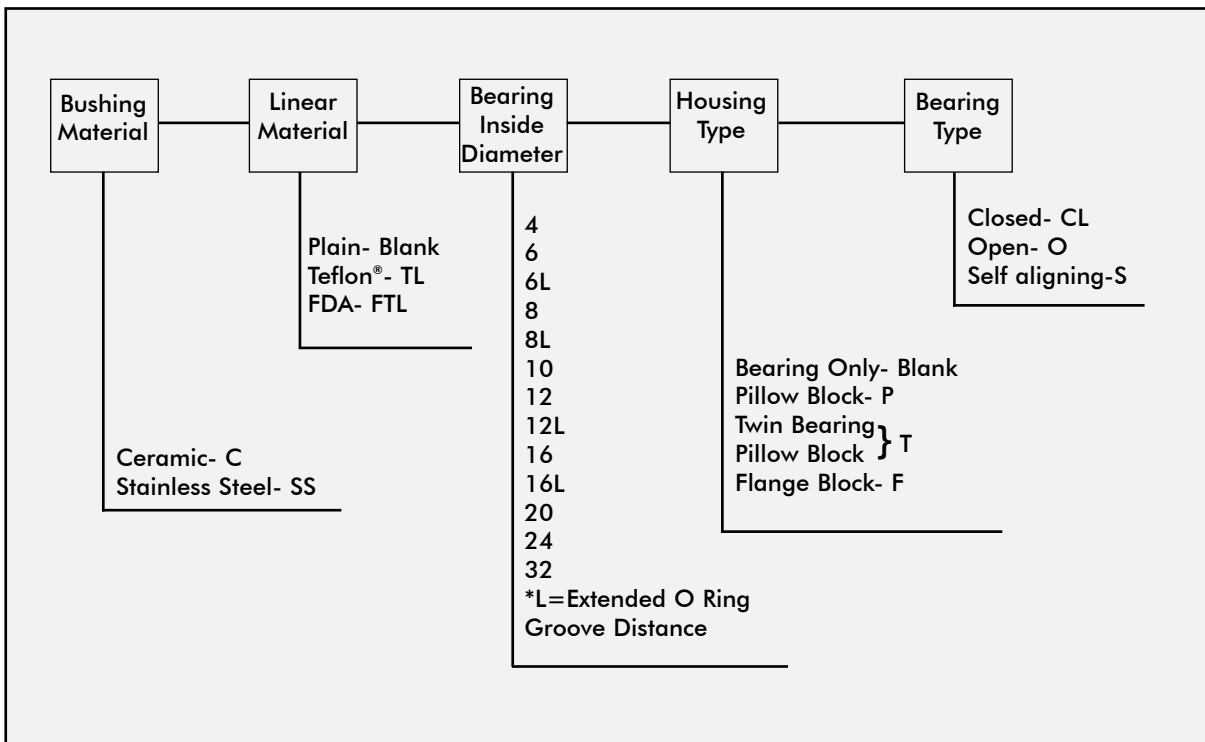
## Shaft Data

Optimum performance of the Ceramic Bearing is achieved when standard hardened and ground "S" or "L" type precision shafting is used. Mild steel shafting or drill rod ground to the same tolerances and finish may also be used. Testing has determined that the ceramic bearing, when run against these softer shaft materials, and lubricated at a frequency of one-hour intervals, results in a coefficient of friction of .05-.06 at a PV limit of 6000.

## Lubricants

In order to achieve maximum performance of the Ceramic bearing, a lubrication method is essential. The proper amount of lubrication required is that amount which maintains a constant thin film during operation. The method selected will depend on the speed- load- coefficient of friction requirements of the application. Approved (tested) lubrication methods include lithium stearate grease,  $\text{MOS}_2$  Dry Film, most oils, greases and moly pastes. We do not recommend using any silicon based spray lubricants.

## Nomenclature



## Performance Data (Ceramic Series)

### Linear Motion Performance Data

Maximum Velocity .....Unlimited  
 Maximum Load (static).....5000 PSI  
 Coefficient of Friction as low as ..... .04

### Rotary Motion Performance Data

Maximum Velocity.....Unlimited  
 Maximum Load (static) .....10,000 PSI  
 Coefficient of Friction as low as..... .04

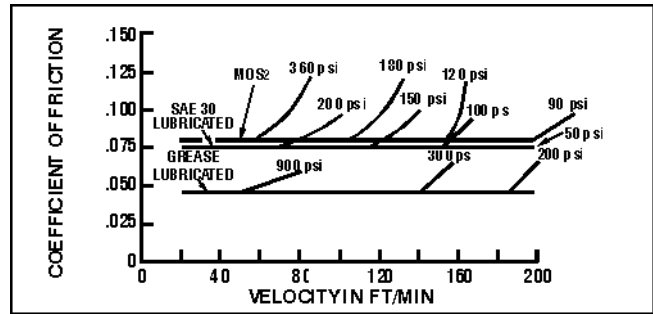
### Temperature Limitation

Low Temp.....-200°F  
 High Temp .....+400°F

### PV Limits Linear Motion

PV limits as applied to plane bearings vary depending upon the manufacturer's testing procedures. The PV limit for the bearing was determined to be that point in the testing where the constant coefficient of friction (e.g. .04 increased to .05) remained at that level or higher. At that point, the test was terminated and that load and speed was determined to be the PV limit. Therefore, it should be noted that the PV limit only signifies an increase in friction, and NOT SIGNIFICANT SURFACE DAMAGE OR WEAR. Please refer to figures D And E to determine PV valuat various speeds and loads.

## 1" Bearing Test



Lubricant	Linear PV Limit 1" Dia. Bearing	Friction Coefficient
SAE 10	15,000	.08
MOS <sub>2</sub>	18,000	.08
SAE 30	25,000	.06
Lithium Stearate Grease	40,000	.04

PRESS FIT I.D. CLOSE IN	
Wall thickness	% Close in (Approx.)
1/16"	100%
3/32"	90%
1/8"	75%
3/16"	60%
1/4"	50%
3/8"	30%
1/2"	20%

Figure D

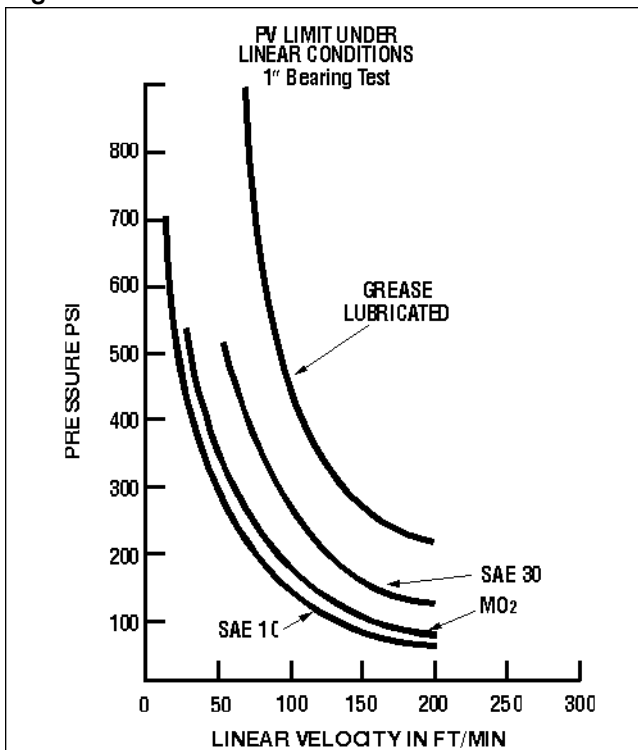


Figure E

