PBC Linear®

PBC Simplicity® Plain Bearings

PBC Linear Plain Bearing Features

- Class III Plain Bearing
- Self-lubricating
- Maintenance free
- Coefficient of friction: 0.125
- Temperature range: ± 400° F
- Bearing Liner Material: FrelonGOLD® (PTFE)
- Bearing Shell Material: Aluminum Alloy with anodized finish
- For Linear, oscillating, rotary motion, or combination of all 3

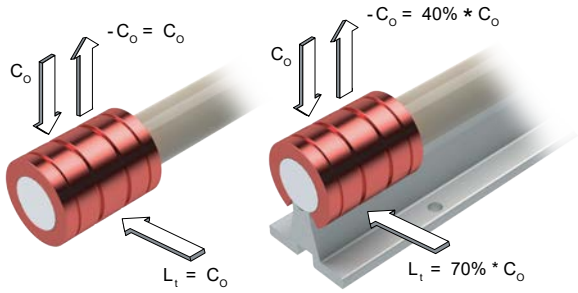
Closed Bearing

Open Bearing

Simplicity Series Plain Bearings

Part Number	Price	Nominal ID	Bearing Form Factor	Effective Surface Area (A)	Running Clearance (Both Sides)	Max Static Load Rating (C_0)	Drawing Links
FL04	$5#n8:	1/4 in	closed	0.20 in^2	0.0005 in	600 lbs	PDF
FL06	$5#n9:	3/8 in		0.34 in^2		1020 lbs	PDF
FL08	$5#na:	1/2 in		0.65 in^2		1950 lbs	PDF
FL10	$5#nb:	5/8 in		0.98 in^2		2940 lbs	PDF
FL12	$5#nc:	3/4 in		1.27 in^2		3810 lbs	PDF
FL16	$5#nd:	1 in		2.35 in^2		7050 lbs	PDF
FL20	$5#ne:	1 1/4 in		3.43 in^2		10830 lbs	PDF
FLN08	$5#n?:	1/2 in	open	0.65 in^2		1950 lbs	PDF
FLN10	$;5#n,:	5/8 in		0.98 in^2		2940 lbs	PDF
FLN12	$5#o0:	3/4 in		1.27 in^2		3810 lbs	PDF
FLN16	$5#o1:	1 in		2.35 in^2		7050 lbs	PDF
FLN20	$5#o3:	1 1/4 in		3.43 in^2		10830 lbs	PDF
FLC04	$;5#nf:	1/4 in	closed	0.20 in^2	0.0015 in	600 lbs	PDF
FLC06	$5#ng:	3/8 in		0.34 in^2		1020 lbs	PDF
FLC08	$5#nh:	1/2 in		0.65 in^2		1950 lbs	PDF
FLC10	$-5#ni:	5/8 in		0.98 in^2		2940 lbs	PDF
FLC12	$-5#nj:	3/4 in		1.27 in^2		3810 lbs	PDF
FLC16	$5#nk:	1 in		2.35 in^2		7050 lbs	PDF
FLC20	$-5#nl:	1 1/4 in		3.43 in^2		10830 lbs	PDF
FLCN08	$5#o4:	1/2 in	open	0.65 in^2		1950 lbs	PDF
FLCN10	$5#o5:	5/8 in		0.98 in^2		2940 lbs	PDF
FLCN12	$5#o6:	3/4 in		1.27 in^2		3810 lbs	PDF
FLCN16	$5#o7:	1 in		2.35 in^2		7050 lbs	PDF
FLCN20	$5#o8:	1 1/4 in		3.43 in^2		10830 lbs	PDF

Compensated plain bearings may feel too loose when installed. This is normal, and required, to prevent binding when used with dual shafts



Running Clearance

Simplicity bearings are available with two classes of running clearance:

Precision–"FL":

- Performs like a preloaded ball bearing
- Tightest running clearance approximately 0.001" (0.025 mm)
- Used in applications that require high precision

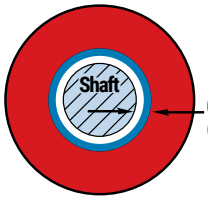
Not recommended for all parallel shaft applications. Any misalignment can cause binding on the shaft.
Recommend: Compensated–"FLC" (see below).

Compensated–"FLC":

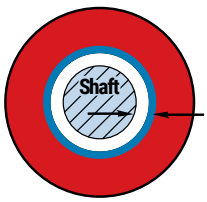
- Performs like a standard ball bearing
- Additional clearance built into the I.D.–all other dimensions are the same as the precision bearings
- Ideally suited for parallel shaft applications

Many parallel shaft applications will run "FL" precision on one rail and "FLC" compensation on the opposite rail to accommodate slight misalignments.

RUNNING CLEARANCE



Standard "FL"
Performs like a preloaded linear ball bearing
0.0005" per side clearance average (0.0127 mm)



Compensated "FLC"
Performs like a standard linear ball bearing
0.0015" + per side clearance average (0.0381 + mm)

PBC Linear®

PBC Simplicity® Pillow Blocks

PBC Linear Simplicity Pillow Block Features

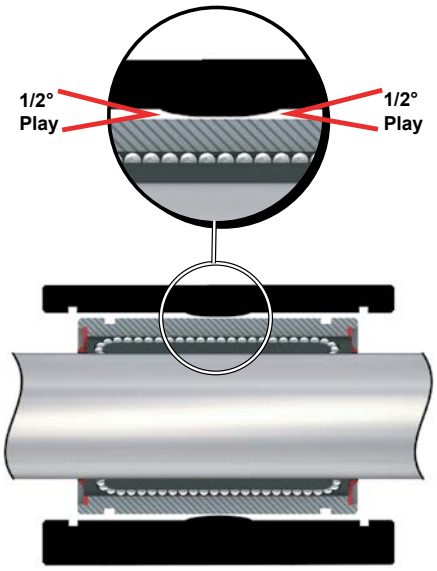
- Simplicity Plain Bearing Pre-installed
- Pillow Block Housing Material: Aluminum alloy with clear anodize finish
- Centerline tolerance: ± 0.001"
- Internal self-aligning feature provides ± 1/2° bearing movement in all directions allowing for some shaft deflection and misalignment

Closed Bearing

Open Bearing

Simplicity Pillow Block

Part Number	Price	Nominal ID	Installed Bearing	Form Factor	Effective Surface Area (A)	Running Clearance (Both Sides)	Max Static Load Rating (C_0)	Drawing Links
P04	$-5#lh:	1/4in	FL04	closed type	0.20 in^2	0.0005 in	600 lbs	PDF
P06	$--5#li:	3/8in	FL06		0.34 in^2		1020 lbs	PDF
P08	$--5#lj:	1/2in	FL08		0.65 in^2		1950 lbs	PDF
P10	$-5#lk:	5/8in	FL10		0.98 in^2		2940 lbs	PDF
P12	$--5#ll:	3/4in	FL12		1.27 in^2		3810 lbs	PDF
P16	$-05#lc:	1in	FL16		2.35 in^2		7050 lbs	PDF
P20	$-05#ld:	1-1/4in	FL20		3.43 in^2		10830 lbs	PDF
PN08	$-5#ls:	1/2in	FLN08	open type	0.65 in^2		1950 lbs	PDF
PN10	$;-5#lt:	5/8in	FLN10		0.98 in^2		2940 lbs	PDF
PN12	$-5#lu:	3/4in	FLN12		1.27 in^2		3810 lbs	PDF
PN16	$-05#lv:	1in	FLN16		2.35 in^2		7050 lbs	PDF
PN20	$-05#lx:	1-1/4in	FLN20		3.43 in^2		10830 lbs	PDF
P04C	$-5#le:	1/4in	FLC04	closed type	0.20 in^2	0.0015 in	600 lbs	PDF
P06C	$;-5#lf:	3/8in	FLC06		0.34 in^2		1020 lbs	PDF
P08C	$-5#lg:	1/2in	FLC08		0.65 in^2		1950 lbs	PDF
P10C	$-5#ln:	5/8in	FLC10		0.98 in^2		2940 lbs	PDF
P12C	$-5#lo:	3/4in	FLC12		1.27 in^2		3810 lbs	PDF
P16C	$-05#lp:	1in	FLC16		2.35 in^2		7050 lbs	PDF
P20C	$-05#lq:	1-1/4in	FLC20		3.43 in^2		10830 lbs	PDF
PN08C	$-5#ly:	1/2in	FLCN08	open type	0.65 in^2		1950 lbs	PDF
PN10C	$-5#lz:	5/8in	FLCN10		0.98 in^2		2940 lbs	PDF
PN12C	$;-5#l]:	3/4in	FLCN12		1.27 in^2		3810 lbs	PDF
PN16C	$;-05#l[:	1in	FLCN16		2.35 in^2		7050 lbs	PDF
PN20C	$-05#l_:	1-1/4in	FLCN20		3.43 in^2		10830 lbs	PDF



Internal Self-aligning Feature

FrelonGOLD® not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart page tLMN-84

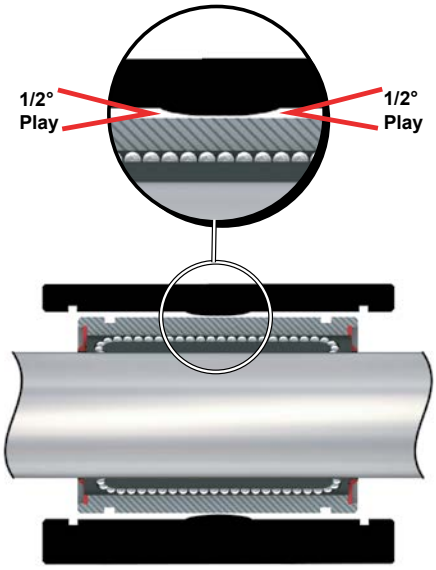
PBC Linear®

PBC Simplicity® Flange Mount Bearings

PBC Linear Simplicity Flange Mount Features

- Simplicity Plain Bearing Pre-installed
- Flange Mount Housing Material: Aluminum alloy with clear anodize finish
- Internal self-aligning feature provides ± 1/2° bearing movement in all directions allowing for some shaft deflection and misalignment

Simplicity Flange Mount Bearing							
Part Number	*Price*	*Nominal ID*	*Installed Bearing*	*Effective Surface Area (A)*	*Running Clearance (Both Sides)*	*Max Static Load Rating (C_o)*	*Drawing Links*
SFP06	$05#nn:	3/8 in	SFP06	0.34 in^2	0.0005 in	1020 lbs	PDF
SFP08	$5#no:	1/2 in	SFP08	0.65 in^2		1950 lbs	PDF
SFP12	$5#np:	3/4 in	SFP12	1.27 in^2		3810 lbs	PDF
SFP16	$05#nq:	1 in	SFP16	2.35 in^2		7050 lbs	PDF
SFP20	$05#ns:	1 1/4 in	SFP20	3.43 in^2		10830 lbs	PDF
SFP06C	$;05#nt:	3/8 in	SFP06C	0.34 in^2	0.0015 in	1020 lbs	PDF
SFP08C	$5#nv:	1/2 in	SFP08C	0.65 in^2		1950 lbs	PDF
SFP12C	$5#nx:	3/4 in	SFP12C	1.27 in^2		3810 lbs	PDF
SFP16C	$05#ny:	1 in	SFP16C	2.35 in^2		7050 lbs	PDF
SFP20C	$05#nz:	1 1/4 in	SFP20C	3.43 in^2		10830 lbs	PDF



Internal Self-aligning Feature

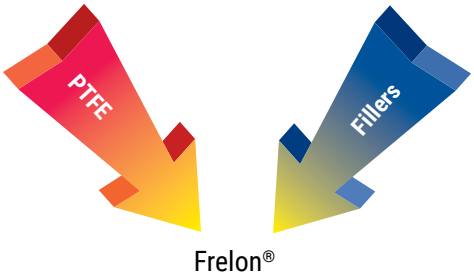
FrelonGOLD® not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart page tLMN-84

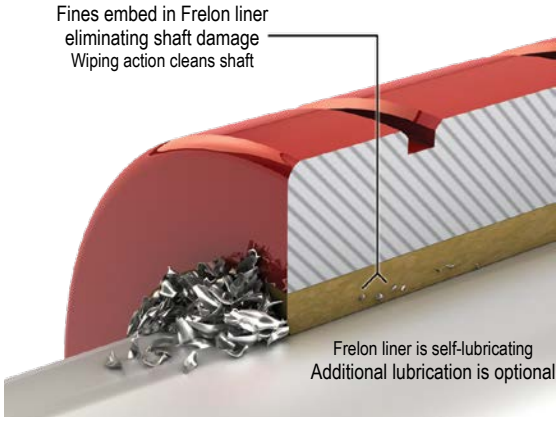
PBC Linear

Frelon GOLD®

What is FrelonGOLD?

FrelonGOLD is a compound of Polyterafluoroethylene (PTFE) and fillers developed for improved performance over other bearings. They provide low wear, low friction, self-lubrication, and high strength.

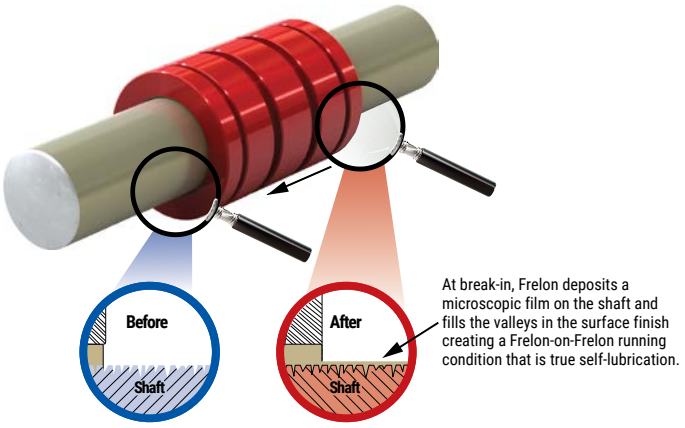




Transfer Process of Liner to Shaft

The interaction of the Frelon® material and the shafting creates a natural, microscopic transfer of the Frelon to the running surface. A thin film is deposited on the shaft, and the valleys in the surface finish are filled in with Frelon material during the initial break-in period. This transfer creates the self-lubricating condition of Frelon riding on Frelon. This break-in period varies depending on several criteria:

1. Preparation of the shafting prior to installation – it is best to clean the shafting with a 3-in-1 type oil before installing the bearings. This ensures that the surface will receive a full transfer of material.
2. Speed, load, and length of stroke specific to the application – typically the initial transfer process will take approximately 50-100 strokes of continuous operation. The running clearance on the bearing will increase an average of 0.0002" to 0.0005", depending on the length of the stroke and surface requiring the transfer.
3. How often the shafting is cleaned – if the shafting is cleaned regularly, increased wear will be seen in the bearings. This is due to the transfer process being performed over and over again.



Performance Ratings (for Linear Motion)

Plain bearings are rated by their limiting Pressure Velocity (PV), which is a combination of load over a given surface area and the velocity.

(-)C_o = Static Load on bearing

A = Bearing effective surface area

V = velocity (speed) in ft/min (m/min.)

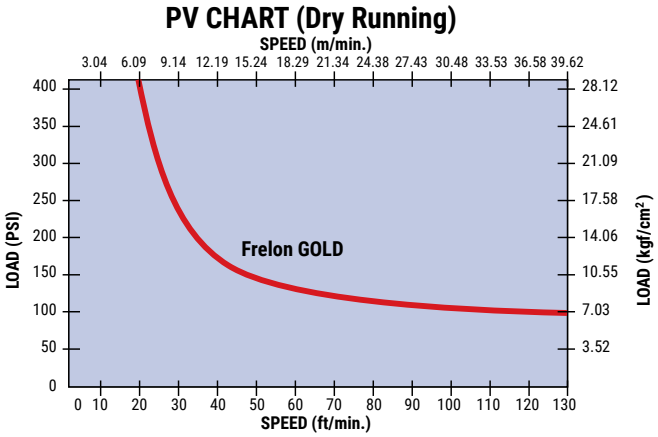
P = Pressure on Bearing = C_o/A

PV = Pressure Velocity

PV_{max}	P_{max}	V_{max}		
		No Lube Continuous Motion	*No Lube Intermittent Motion*	*With Lubrication**
20000 (psi x ft./min.)	3000 psi	300 ft/min	825 ft/min	825 ft/min
430 (kgf/cm2 x m/min.)	210.9 kgf/cm2	1.524 m/sec.	4.19 m/sec.	4.19 m/sec.

***Depending on the lubrication used, loads, and frequency of continuous or intermittent motion, speeds can be in excess of the numbers shown.**

FrelonGOLD not recommended for use with deionized water and other harsh chemicals. See the chemical reaction chart



Recommended Lubricants:

- Waylube oil
- Light weight oils
- Petroleum based grease
- 3-in-1 oils

Not Recommended Lubricants:

- WD-40
- PTFE sprays
- Fluorocarbons
- Silicon oils

Prior to use, it is best to clean the rail with a 3-in-1 type oil before installing the carriages. This ensures that the surface will receive a full transfer of Frelon material during break-in

PBC Linear

Chemical Reaction Chart for Simplicity® Bearings

The FrelonGOLD® material is a composite of PTFE and a bearing filler. The PTFE is chemically inert. The chemical resistance shown in the chart below is defined by the compatibility of the filler with the various chemicals.

Other data in the chart below applies to the bearing shell and pillow block materials. The table is provided as a reference only. The data given will be affected by factors such as temperature, PV, degree of contact, strength of solution, etc. In each specific application, it is always advisable to conduct specific testing to determine suitability of use. This table only addresses general corrosion, NOT galvanic, SCC, or other types of corrosion. Corrosion rates are at room temperature unless otherwise noted.

Standard and hard coat data only apply when the coating is intact. If the coating is worn through or damaged, an area of galvanic and pitting corrosion will be created. Then use the bare aluminum data.

Standard Simplicity products use aluminum alloy, which is known to have the best corrosion resistance of the high strength aluminum alloys. The sulfuric bath anodizing and nickel acetate sealing provide the best corrosion resistance available in anodized coatings. They can withstand a rigorous 14-day exposure in a 5% salt spray solution at 96°F per military specifications without significant damage. With the coating intact, it is considered to be inert in most fluids with a pH value between 5 and 8. Hard coat anodizing provides the same chemical resistance but is applied to a 0.002" thickness, providing a more durable surface that will stand up to greater abuse. However, if the coating is penetrated, the resistance is reduced.

Special stainless steel bearings use AISI 316 stainless, which has superior resistance over 303, 304, 420, 440, 17-4PH, and most other common stainless grades. 316 is generally considered to be the most corrosion resistant of conventional stainless steels.

This information was compiled for Pacific Bearing® Company by Materials Engineering, Inc. of Virgil, IL. This specification information is believed to be accurate and reliable, however, no liability is assumed. Information is for reference only. User must test specific applications.

Performance	Wear
E = Excellent	< 0.002" per year
G = Good	< 0.020" per year
S = Satisfactory	< 0.050" per year
U = Unsatisfactory	> 0.040" per year

Chemical	Frelon GOLD	Bare Aluminum	Standard & Hard Coat Anodized Aluminum	316 Stainless Steel
Acetic Acid, 20%	U	G	G	E
Acetone	G	E	E	E
Ammonia, Anhydrous	G	E	E	E
Ammonium Hydroxide, 10%	U	U	U	E
Ammonium Chloride, 10%	U	U	U	G
Ammyl Acetate (122°F / 50°C)	G	E	E	E
Barium Hydroxide	U	U	U	G
Beer	G	E	E	E
Boric Acid Solutions	G	E	E	G
Butane	G	G	G	G
Calcium Chloride, 20%	G	G	G	G
Calcium Hydroxide, 10%	G	G	G	G
Carbon Dioxide	G	E	E	G
Carbon Monoxide	G	E	E	E
Chlorine Gas, Dry	G	G	G	G
Chlorine Gas, Wet	U	U	U	U
Chromic Acid, 10%	U	G	E	E
Citric Acid, 5%	G	E	E	E
Ethyl Acetate	G	E	E	G
Ethyl Alcohol	G	E	E	G
Ethylene Glycol	G	E	E	G
Ferric Chloride, 50%	U	U	U	U
Formic Acid - Anhydrous	U	E	E	E
Gasoline, Unleaded	G	G	G	G
Hydrochloric Acid, 20%	U	U	U	U
Hydrochloric Acid, 35%	U	U	U	U
Hydrocyanic Acid, 10%	U	G	G	G
Hydrofluoric Acid - Dilute	U	U	U	U
Hydrofluoric Acid, 48%	U	U	U	U
Hydrogen	G	E	E	E
Hydrogen Peroxide - Dilute	U	E	E	G

Chemical	Frelon GOLD	Bare Aluminum	Standard & Hard Coat Anodized Aluminum	316 Stainless Steel
Hydrogen Sulfide, Dry	U	G	E	E
JP-4	G	G	G	G
Kerosene	G	G	G	G
Lacitic Acid, 10%	G	G	G	E
Magnesium Chloride, 50%	G	U	U	G
Mercury	U	U	U	E
Methyl Alcohol	G	G	G	G
Methyl Ethyl Ketone	G	G	G	G
Methylene Chloride	G	E	E	G
Mineral Oil	G	G	G	G
Naptha	G	G	G	G
Nitric Acid, 70%	U	U	U	E
Phosphoric Acid, 10%	U	U	U	E
Sodium Chloride	G	U	U	E
Sodium Hydroxide, 20%	G	U	U	G
Sodium Hypochlorite, 20%	U	G	G	U
Sodium Peroxide, 10%	U	G	G	G
Steam (see water)	-	-	-	-
Sulfur Dioxide, Wet	U	U	U	G
Sulfur Dioxide, Dry	G	G	G	G
Sulfur Trioxide	U	G	G	G
Sulfuric Acid, 50%	U	U	U	U
Sulfurous Acid	U	G	G	E
Toluene (122°F / 50°C)	G	E	E	E
Turpentine	G	G	E	E
Water, Demineralized	U	G	E	E
Water, Distilled	G	U	S	G
Sea Water	G	G	E	G
Water, Sewage	G	U	S	G
Xylene	G	G	G	G
Zinc Chloride Solutions	U	U	U	G

PBC Linear

PBC Linear Shafts and Shaft Supports

PBC Linear Simplicity® 60 Plus Linear Shaft Features

- Optimized surface finish for plain and ball bearings
- Straightness: 0.001"–0.002" per ft cumulative
- Length Tolerance: ±0.030"
- Surface Finish: 8-12Ra
- Hardness:
  - RC60-65 for 1060 Steel
  - RC50-55 for 440C Stainless Steel

In most applications, smoother is not better; in fact it means decreased performance and shortened life. PBC Linear has engineered the surface finish for optimum performance

PBC Linear Shafts (1060 Carbon Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
NIL04-006.000-SL	$--5#ji:	1/4in	6.0 in	1060 steel	PDF
NIL04-012.000-SL	$--5#jj:		12.0 in		PDF
NIL06-006.000-SL	$-5#jk:	3/8in	6.0 in		PDF
NIL06-012.000-SL	$--5#jl:		12.0 in		PDF
NIL06-018.000-SL	$-5#jn:		18.0 in		PDF
NIL08-012.000-SL	$-5#jo:	1/2in	12.0 in		PDF
NIL08-024.000-SL	$-5#jp:		24.0 in		PDF
NIL08-036.000-SL	$-5#jq:		36.0 in		PDF
NIL10-012.000-SL	$-5#js:	5/8in	12.0 in		PDF
NIL10-024.000-SL	$;-5#jt:		24.0 in		PDF
NIL10-036.000-SL	$-5#ju:		36.0 in		PDF
NIL12-012.000-SL	$-5#jv:	3/4in	12.0 in		PDF
NIL12-024.000-SL	$-5#jx:		24.0 in		PDF
NIL12-036.000-SL	$-5#jy:		36.0 in		PDF
NIL16-012.000-SL	$-5#jz:	1in	12.0 in		PDF
NIL16-024.000-SL	$;-5#j]:		24.0 in		PDF
NIL16-036.000-SL	$;-5#j[:		36.0 in		PDF
NIL20-012.000-SL	$-5#j_:	1-1/4in	12.0 in		PDF
NIL20-024.000-SL	$-5#j#:		24.0 in		PDF
NIL20-036.000-SL	$;-5#j!:		36.0 in		PDF

PBC Linear Shafts (440C Stainless Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
NIL06SS-006.000-SL	$-5#j?:	3/8in	6.0 in	440C stainless steel	PDF
NIL06SS-012.000-SL	$;-5#j,:		12.0 in		PDF
NIL08SS-012.000-SL	$5#k0:	1/2in			PDF
NIL08SS-024.000-SL	$5#k1:		24.0 in		PDF
NIL08SS-036.000-SL	$5#k2:		36.0 in		PDF
NIL10SS-012.000-SL	$5#k3:	5/8in	12.0 in		PDF
NIL10SS-024.000-SL	$5#k4:		24.0 in		PDF
NIL10SS-036.000-SL	$05#k5:		36.0 in		PDF
NIL12SS-012.000-SL	$5#k6:	3/4in	12.0 in		PDF
NIL12SS-024.000-SL	$5#k7:		24.0 in		PDF
NIL12SS-036.000-SL	$05#k8:		36.0 in		PDF
NIL16SS-012.000-SL	$5#k9:	1in	12.0 in		PDF
NIL16SS-024.000-SL	$05#ka:		24.0 in		PDF
NIL16SS-036.000-SL	$05#kb:		36.0 in		PDF
NIL20SS-012.000-SL	$5#kc:	1-1/4in	12.0 in		PDF
NIL20SS-024.000-SL	$05#kd:		24.0 in		PDF
NIL20SS-036.000-SL	$05#ke:		36.0 in		PDF

PBC Linear Shaft Support Features

- End support blocks can be used for end or intermediate shaft support
- Instant bolt-down installation
- Lightweight and strong.
- Can be used with all shaft types.
- Should be used where deflection between supports is not a problem.
- Material: Aluminum with anodize finish
- Center height tolerance: +/- 0.001"

PBC Shaft Support

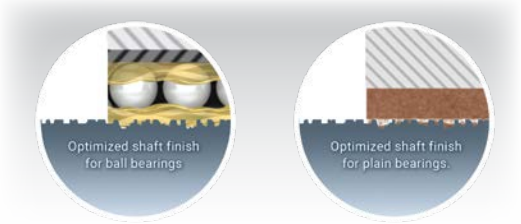
Part Number	Price	Nominal Diameter	Center Height	Drawing Links
NSB04	$-5#l7:	1/4 in	11/16 in	PDF
NSB06	$-5#l8:	3/8 in	3/4 in	PDF
NSB08	$-5#l9:	1/2 in	1 in	PDF
NSB10	$-5#la:	5/8 in	1 in	PDF
NSB12	$-5#lb:	3/4 in	1-1/4 in	PDF
NSB16	$-5#l5:	1 in	1-1/2 in	PDF
NSB20	$-5#l6:	1-1/4 in	1-3/4 in	PDF

PBC Linear

PBC Linear Supported Shafts

PBC Linear Simplicity® 60 Plus Supported Linear Shaft Features

- Optimized surface finish for plain and ball bearings
- Straightness: 0.001"–0.002" per ft cumulative
- Length Tolerance: ±0.030"
- Surface Finish: 8-12Ra
- Hardness:
  - RC60-65 for 1060 Steel
  - RC50-55 for 440C Stainless Steel
- Shaft support material: Aluminum
- Centerline tolerance: ±0.002"



In most applications, smoother is not better; in fact it means decreased performance and shortened life. PBC Linear has engineered the surface finish for optimum performance

PBC Supported Linear Shafts (1060 Carbon Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
SRA08-012.000-SL	$;05#kf:	1/2in	12.0 in	1060 steel	PDF
SRA08-024.000-SL	$05#kg:		24.0 in		PDF
SRA08-036.000-SL	$05#kh:		36.0 in		PDF
SRA10-012.000-SL	$-05#ki:	5/8in	12.0 in		PDF
SRA10-024.000-SL	$-05#kj:		24.0 in		PDF
SRA10-036.000-SL	$05#kk:		36.0 in		PDF
SRA12-012.000-SL	$-05#kl:	3/4in	12.0 in		PDF
SRA12-024.000-SL	$05#kn:		24.0 in		PDF
SRA12-036.000-SL	$05#ko:		36.0 in		PDF
SRA16-012.000-SL	$05#kp:	1in	12.0 in		PDF
SRA16-024.000-SL	$05#kq:		24.0 in		PDF
SRA16-036.000-SL	$05#ks:		36.0 in		PDF
SRA20-012.000-SL	$;05#kt:	1-1/4in	12.0 in		PDF
SRA20-024.000-SL	$05#ku:		24.0 in		PDF
SRA20-036.000-SL	$05#kv:		36.0 in		PDF

PBC Supported Linear Shafts (440C Stainless Steel)

Part Number	Price	Nominal Diameter	Length	Material	Drawing Links
SRA08SS-012.000-SL	$05#kx:	1/2in	12.0 in	440C stainless steel	PDF
SRA08SS-024.000-SL	$05#ky:		24.0 in		PDF
SRA08SS-036.000-SL	$05#kz:		36.0 in		PDF
SRA10SS-012.000-SL	$;05#k]:	5/8in	12.0 in		PDF
SRA10SS-024.000-SL	$;05#k[:		24.0 in		PDF
SRA10SS-036.000-SL	$05#k_:		36.0 in		PDF
SRA12SS-012.000-SL	$05#k#:	3/4in	12.0 in		PDF
SRA12SS-024.000-SL	$;05#k!:		24.0 in		PDF
SRA12SS-036.000-SL	$05#k?:		36.0 in		PDF
SRA16SS-012.000-SL	$;05#k,:	1in	12.0 in		PDF
SRA16SS-024.000-SL	$-05#l0:		24.0 in		PDF
SRA16SS-036.000-SL	$-05#l1:		36.0 in		PDF
SRA20SS-012.000-SL	$-05#l2:	1-1/4in	12.0 in		PDF
SRA20SS-024.000-SL	$-05#l3:		24.0 in		PDF
SRA20SS-036.000-SL	$-05#l4:		36.0 in		PDF