

PULLEYS

SMALL NYLON PULLEYS – BEARING MOUNTED

GENERAL INFORMATION

SAVA's Bearing Mounted Nylon Pulleys are primarily engineered and designed for use with small cables and cords. They offer greatly increased mechanical efficiency over plastic pulleys and are considerably less expensive than bearing mounted pulleys now available. SAVA pulleys are being used on recorders, metering equipment, indicators, control mechanisms, drive systems, etc.

Two basic types of bearing mounted pulleys are offered. The SP series is used where a more precise shielded bearing is required and the UP series where a commercial type bearing is adequate. These are described in more detail with the charts. In addition to the pulleys shown, SAVA can manufacture special diameters and shapes to fit your requirements.

In all cases where "CABLE SIZES TO" are noted, it should be understood that this includes the coating, if any.

SP SERIES PULLEYS

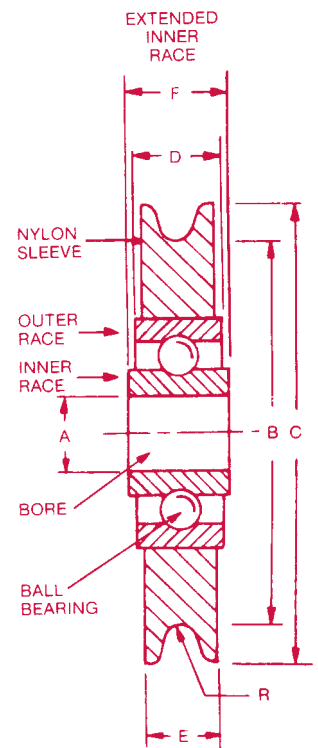
The SP series pulleys below incorporate a precision, double shielded, lubricated single row ball bearing which is ABEC3 precision built to give all the accuracy needed to satisfy the load, speed, and life expectancy requirements of many applications now using more expensive ultra-precise bearings.

Please note that pulleys with extended inner races are more expensive than those without extensions.

SAVA ITEM	REF. OLD PART NO.	DIMENSIONS						CABLE SIZES TO	LOAD ² (LBS)	
		A ± .0005	B ± .020	C ± .020	D ± .010	E ± .010	F ¹ + .000 - .005			R REF.
SP2031 SP2031E	SP-231 SP-231-E	.125	.310	.375	.110	.093	N/A .141	.015	1/32	10
SP2044 SP2044E	SP-243 SP-243-E	.125	.437	.500	.156	.125	N/A .188	.025	3/64	10
SP2050 SP2050E	SP-250 SP-250-E	.125	.500	.625	.156	.125	N/A .188	.015	1/32	10
SP2063 SP2063E	SP-263 SP-263-E	.125	.625	.750	.156	.156	N/A .188	.025	3/64	10
SP3050E	SP-248-E	.1875	.500	.625	.125	.125	.156	.015	1/32	10
SP3088	SP-387	.1875	.885	1.070	.250	.219	N/A	.025	3/64	90
SP3106	SP-310	.1875	1.063	1.250	.250	.219	N/A	.035	1/16	90
SP4088 SP4088E	SP-487 SP-487-E	.250 .250	.885	1.070	.281 .188	.219 .188	N/A .219	.025	3/64	90
SP4125	SP-613	.250	1.250	1.500	.281	.281	N/A	.050	3/32	90
SP4138	SP-614	.250	1.375	1.750	.281	.281	N/A	.065	1/8	90

NOTES: ¹Where F dimension is not applicable (N/A) on the chart, the bearing does not have an extended inner race.

²Dynamic Load Rating is given in lbs. at 500 RPM.



BEARING LIFE

The load ratings shown on the dimensional tables give the approximate dynamic capacity of the bearings under normal operating conditions of constant load and speed of 2500 hours average life. These figures assume that the bearings are properly mounted, operate under clean conditions, and are properly lubricated. For load ratings at speeds other than 500 PM shown in the dimensional table, multiply the rating at 500 RPM by the following factors:

$$\frac{50 \text{ RPM}}{2.50}$$

$$\frac{100 \text{ RPM}}{1.90}$$

$$\frac{300 \text{ RPM}}{1.23}$$

$$\frac{800 \text{ RPM}}{.83}$$

$$\frac{1000 \text{ RPM}}{.76}$$

The above figures are estimates based on statistical evidence and are intended to serve as a guide.

The nylon pulley is a press fit over the bearing. Improper alignment of cable or cord may cause premature failure of the bearing or in certain installations cause the pulley sleeve to

It is frequently necessary to determine what life a bearing will have when operating under a known or mean radial load at some constant or average speed. The Load-Life Formula may be written as follows:

$$\text{LIFE (UNKNOWN) @} = \frac{\text{Load Rating at 2500 hours}}{\text{Actual Radial Load}}$$

come off. Since there is considerable variation in application, we recommend actual life tests for your intended use.

NOTE: Most pulleys can be supplied with metric bearings; please inquire. Pulleys can be manufactured out of other plastics for an additional cost.

SMALL NYLON PULLEYS – BEARING MOUNTED (Cont.)

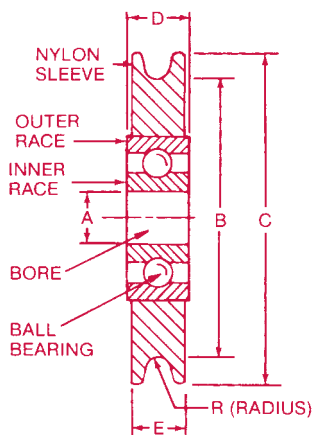


UP SERIES PULLEYS

SAVA's inexpensive UP series pulleys are used for moderate load and speed application not requiring the use of more precise ground bearings. The bulk of all applications falls into this category. The UP series pulleys are furnished with an open-type precision machined ball bearing, which is lightly lubricated.

UP2044, UP2050, and UP2063 are also available with open-type, ABEC1 precision ground bearings with ball retainers and are very free turning. If you wish to purchase a precision ground bearing for these pulleys, specify the pulley part followed by R2X1 Bearing; e.g., UP2044R2X1.

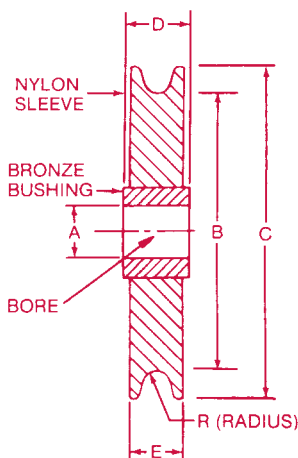
UP PULLEY



SAVA ITEM	REF. OLD PART NO.	A + .005 - .001	B ± .020	C ± .020	D ± .010	E ± .010	R REF.	CABLE SIZES TO	LOAD ² (LBS)
UP2044	UP-243	.125	.437	.500	.156	.125	.025	3/64	10
UP2050	UP-250	.125	.500	.625	.156	.125	.015	1/32	10
UP2063	UP-263	.125	.625	.750	.156	.156	.025	3/64	10
UP2081 ¹	UP-281	.125	.813	1.000	.171	.156	.025	3/64	35
UP3088	UP-387	.187	.885	1.070	.250	.219	.025	3/64	35
UP3106	UP-310	.187	1.063	1.250	.250	.219	.035	1/16	45
UP4088	UP-487	.250	.885	1.070	.250	.219	.025	3/64	35
UP4106	UP-410	.250	1.063	1.250	.250	.219	.035	1/16	45
UP4125	UP-413	.250	1.250	1.500	.312	.281	.050	3/32	80
UP4138	UP-414	.250	1.375	1.750	.312	.281	.065	1/8	80
UP6125	UP-613	.375	1.250	1.500	.312	.281	.050	3/32	70
UP6138	UP-614	.375	1.375	1.750	.312	.281	.065	1/8	70

NOTES: ¹UP2081 contains an ABEC1 precision ground shielded bearing with bore tolerance ± .0005.
²Dynamic Load Rating is given in lbs. at 500 RPM.

MP PULLEY



MP SERIES PULLEYS

This line of nylon pulleys offers an oil-impregnated bushing of porous, sintered, self-lubricating bronze. This vacuum impregnated oil, equivalent to SAE 30, supplements the pure bronze structure and forms a hydraulic cushion which absorbs unusual shock and permits the bushing to carry heavier loads than the SP of UP series pulleys. This nylon pulley is also highly corrosion and wear resistant.

SAVA ITEM	REF. OLD PART NO.	A ± .002	B ± .020	C ± .020	D ± .010	E ± .010	R REF.	CABLE SIZES TO	STATIC LOAD LBS MAX.
MP2063	MP-263	.127	.625	.750	.187	.156	.025	3/64	20
MP3088	MP-387	.189	.885	1.070	.250	.219	.025	3/64	70
MP3106	MP-310	.189	1.063	1.250	.250	.219	.035	1/16	90
MP4088	MP-487	.252	.885	1.070	.250	.219	.025	3/64	70
MP4106	MP-410	.252	1.063	1.250	.250	.219	.035	1/16	90
MP4125	MP-413	.252	1.250	1.500	.313	.281	.050	3/32	160
MP4138	MP-414	.252	1.375	1.750	.313	.281	.065	1/8	180
MP6125	MP-613	.377	1.250	1.500	.313	.281	.050	3/32	160
MP6138	MP-614	.377	1.375	1.750	.313	.281	.065	1/8	180

STORAGE

SAVA's nylon pulleys with oil-impregnated sintered bronze bushings can be stored indefinitely in suitable containers using plastic bags, wax paper, metal, glass, etc. Woods, ordinary paper and cardboard are not suitable since they absorb oil from the bushings. Properly stored SAVA's oil-impregnated bushings retain their oil supply indefinitely.

ZINC PLATED STEEL PULLEYS WITH SHIELDED & UNSHIELDED BALL BEARING

CP SERIES PULLEYS

This economical line of precision machined ball bearing pulleys is grooved for small cables. They offer precision steel balls, case-hardened steel races, light lube, machined raceways, and are zinc plated.

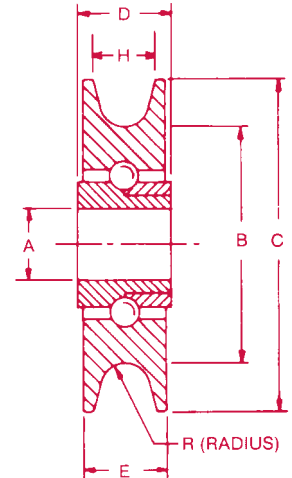
For shielded pulleys, which are internally lubricated and have plastic seals, add "S" after "CP" prefix, such as CPS2038.



SHIELDED



UNSHIELDED



SAVA ITEM	REF. OLD PART NO.	A + .005 - .000	B ± .010	C ± .010	D ± .005	E ± .005	H ± .005	R REF.	CABLE SIZES TO	RADIAL CAPACITY AT 50 RPM*
CP(S)2038	CP(S)-243	.125	.380	.500	.188	.156	.096	.025	3/64	36 lbs.
CP(S)3075	CP(S)-375	.187	.750	1.000	.375	.312	.219	.065	1/8	145 lbs.
CP(S)3088	CP(S)-387	.187	.875	1.060	.281	.250	.190	.050	3/32	175 lbs.
CP(S)4088	CP(S)-487	.250	.875	1.250	.437	.375	.250	.095	3/16	175 lbs.
CP(S)6125	CP(S)-413	.375	1.250	1.750	.500	.437	.315	.125	1/4	290 lbs.
CP(S)6150	CP(S)-650	.375	1.500	2.000	.500	.437	.315	.125	1/4	410 lbs.

NOTES: *The sum of the radial and thrust load on any installation should not exceed the radial load capacity. To obtain the radial capacity at other speeds, multiply the radial capacity above with the following conversion factors:
100 RPM - .75; 300 RPM - .39; 600 RPM - .28; 900 RPM - .22; 1,000 RPM - .19.

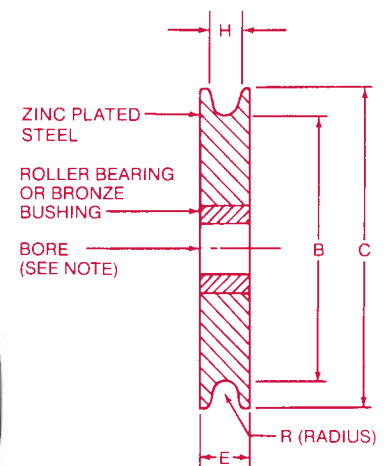
ZINC PLATED STEEL PULLEYS WITH BRONZE BUSHINGS OR ROLLER BEARINGS*

OP SERIES PULLEYS

This line of OP Pulleys is a continuation of the CP Series, except this pulley allows for larger cable up to 3/8". The OP Series also offers a more economical and optional bronze bushing or roller bearing.

SAVA ITEM	REF. OLD PART NO.	B ± .015	C + .015	E ± .010	H ± .010	R REF.	CABLE SIZES TO
OP0150	OP-163	1-1/2	2	.440	.345	.125	3/16
OP0200	OP-200	2	2-1/2	.440	.345	.150	1/4
OP0250	OP-250	2-1/2	3	.625	.530	.215	5/16
OP0281	OP-298	2-13/16	3-1/2	.625	.530	.240	3/8

NOTE: For availability of bushings and bearings, please refer to page 33.

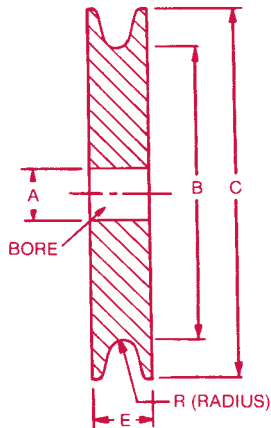


BLACK DELRIN[®] PULLEYS

BP SERIES PULLEYS

The chemical composition, regular structure, and high crystallinity of Delrin[®] give SAVA Black Delrin[®] pulleys a combination of physical properties not available with either metals or other plastics such as:

- High mechanical strength and rigidity
- Fatigue endurance unmatched by other plastics
- Excellent resistance to moisture, gasoline, sunlight, solvents, and many other neutral chemicals
- Good electrical insulating characteristics
- Excellent dimensional stability and wide useful temperature range (+347°F melt point)
- Resiliency
- Natural lubricity



SAVA ITEM	REF. OLD PART NO.	OTHER BORES ARE AVAILABLE A ± .005	B ± .020	C ± .020	E ± .010	R REF.	CABLE SIZES TO
BP2031	BP-231-2	.128	.310	.375	.093	.015	1/32
BP2044	BP-243	.128	.438	.500	.125	.025	3/64
BP2050	BP-250	.128	.500	.625	.125	.015	1/32
BP2063	BP-263	.128	.625	.750	.156	.025	3/64
BP3081	BP-381	.190	.813	1.000	.170	.025	3/64
BP3088	BP-387	.190	.885	1.070	.219	.025	3/64
BP3106	BP-310	.190	1.063	1.250	.219	.035	1/16
BP4122	BP-416	.254	1.225	1.575	.330	.095	3/16
BP4125	BP-413	.254	1.250	1.500	.281	.050	3/32
BP4138	BP-414	.254	1.375	1.730	.281	.065	1/8
BP5158	BP-516	.316	1.580	1.950	.405	.125	1/4
The following pulleys are manufactured from nylon. They are primarily used for fiber rope; however, in many cases they function well with cables.							
BP4061	BP-406	.254	.615	.960	.400	.170	1/4-5/16
BP4100	BP-411	.254	1.000	1.375	.400	.135	1/4
BP4118	BP-412	.268	1.175	1.750	.440	.130	1/4

NOTE: BP4100 and BP4118 have extended hubs of .025 per side.

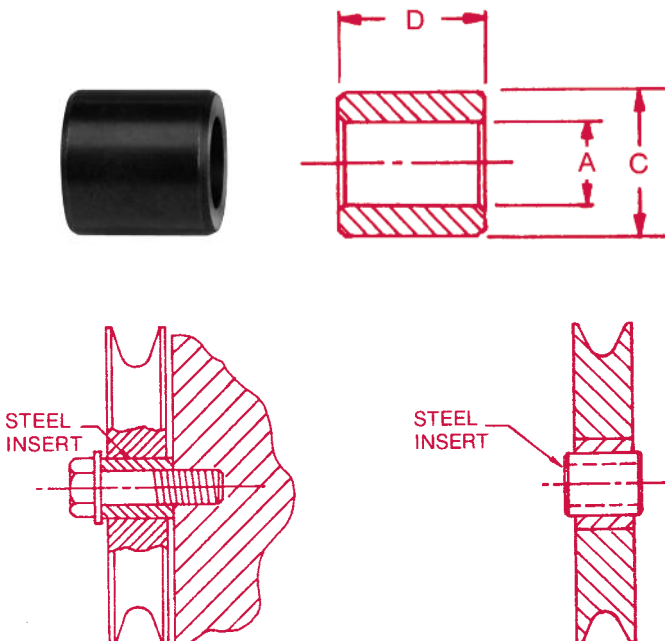
STEEL INSERTS

BI SERIES INSERTS

These inexpensive steel inserts can be used to reduce bore diameters. They are made wider than our pulley bearings so that the pulley can rotate freely while the insert is held on the sides.

The inserts are case-hardened and black oxide finished.
USED PRIMARILY ON OP AND LP SERIES PULLEYS

SAVA ITEM	REF. OLD PART NO.	A ± .002	C ± .002	D REF.
BI192531	BI-45	3/16	1/4	5/16
BI255050	BI-50	1/4	1/2	1/2
BI1315050	BI-55	5/16	1/2	1/2
BI1385050	BI-60	3/8	1/2	1/2
BI1387575	BI-65	3/8	3/4	3/4
BI1507575	BI-70	1/2	3/4	3/4



“MD” NYLON PULLEYS

LP SERIES PULLEYS

SAVA LP Pulleys utilize a high strength molded nylon containing finely divided particles of molybdenum disulfide (“MD”) solid lubricant.

CONSIDER THESE ADVANTAGES

- Reduced cost
- 6-1 weight savings over steel
- Corrosion resistant
- Self lubricating
- Nongalling
- Low friction
- High tensile strength
- Abrasion-resistant properties
- Runs quietly and smoothly
- Low coefficient of thermal expansion
- Lower H₂O absorption
- Excellent impact resistance
- Less heat-generating friction
- Excellent vibration and fatigue resistance



...ALSO

- The improved strength of the molybdenum disulfide (“MD”)–impregnated nylon enables it to support bearing loads greater than other thermoplastic materials.
- The inherent resiliency of this material enables it to return to original dimension after deformation because of unusual extreme loading.

...AND

- Bare wire rope used in conjunction with this type of LP pulleys has shown **450%** improvement in the endurance life of bare wire rope when tested at 10%, and 220% improvement when tested at 20% of wire rope breaking strength.

SAVA LP pulleys can also be molded from the basic plastics listed in the chart below. “MD” nylon, we feel, has properties which offer overall advantages. However, it cannot be offered in colors as other plastics. Polyethylene and polypropylene offer significant cost advantages but with considerable loss of physical properties as indicated on the chart.

PHYSICAL PROPERTIES OF BASIC PLASTICS

PHYSICAL PROPERTIES	ASTM	UNIT	“MD” NYLON	NYLON 6/6	ACETAL	HIGH-DENSITY POLYETHYLENE	POLY-PROPYLENE
Tensile Strength	D638	PSI	13,500	9,000-12,000	8,800-12,000	2,500-4,300	4,000-5,500
Elongation at Break	D638	%	15	20-200	12-75	170-180	200-700
Shear Strength	D732	PSI	10,500	9,600	7,700-9,500		
Flexural Strength (Yield)	D790	PSI	16,500	12,500-14,000	13,000-15,500		5,000-7,000
Hardness, Rockwell	D785	R	119	110-120	119-122		50-96
Compressive Strength	D695	PSI	13,000	5,000	16,000		3,500-8,000
Deflection Temperature °F (264 PSI)	D648	°F	210	200-450	230-255	154-158	115-140

NOTE: This information, based on our experience, is in line with accepted engineering practice and is believed to be reliable. However, we do not warrant the conformity of our materials to the listed properties or the suitability of our materials for a particular purpose.

How to Order:

For pulleys without bushings or bearings, select pulley number from table on page 32, and add size of bore if you wish SAVA to bore the pulley; e.g., LP0438-.625.

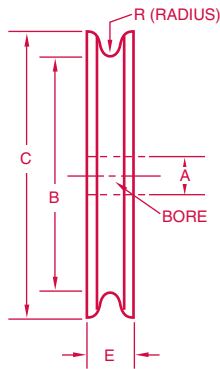
For pulleys with bushings or bearings, select pulley number from table on page 32, and add bushing or bearing number from respective tables on page 33; e.g., LP0338-RB385650.

GENERAL NOTES: For volume customers, your name or logo can be substituted for the SAVA logo. Custom-designed pulleys can be made to your specific size requirements. Please provide a drawing showing the dimensions as outlined in the sketch on page 32.

These pulleys can also be assembled with the bore inserts shown on page 30 of our catalog.

Pulley and cable alignment is very important in preventing premature failure and attaining long life in working or in static load conditions. Any application which has inherent pulley-cable misalignment should be thoroughly tested for the application.

LP SERIES PULLEYS



SAVA ITEM	REF. OLD PART NO.	PLAIN BORE SIZE RANGE A' +.002 - .001	B REF.	C REF.	E REF.	R REF.	FOR CABLE SIZES	TYPE	MAX. LOAD ³ (LBS.)	APPROX. WT. EA. OZ.
LP0220	LP-22	.375 - 1.000	2.200	2.500	.250	.050	1/16 - 3/32	A	200	.7
LP0188	LP-18	.375 - .625	1.875	2.440	.687	.160	1/8 - 5/16	B	1600	1.3
LP0200	LP-20	.375 - .625	2.000	2.500	.438	.110	1/8 - 3/16	B	800	.9
LP0250	LP-25	.375 - .625	2.500	3.000	.438	.110	1/8 - 3/16	B	800	1.2
LP0256	LP-26	.375 - .625	2.563	3.000	.625	.190	1/8 - 3/8	B	1600	1.5
LP0300	LP-30	.375 - .625	3.000	3.500	.438	.110	1/8 - 3/16	B	800	1.4
LP0338	LP-33	.375 - 1.000	3.375	4.000	.500	.140	3/16 - 1/4	B	1400	2.5
LP0388	LP-38	.375 - 1.000	3.875	4.500	.500	.140	3/16 - 1/4	B	1400	2.8
LP0438	LP-43	.500 - 1.000	4.375	5.000	.500	.140	3/16 - 1/4	B	1400	3.5
LP0463	LP-46	.500 - 1.000	4.625	5.500	.625	.170	1/4 - 5/16	C	1600	4.3
LP0513	LP-51	.500 - 1.000	5.125	6.000	.625	.200	1/4 - 3/8	C	1600	5.6
LP0525	LP-52	.500 - 1.000	5.250	6.000	.625	.170	1/4 - 5/16	C	1600	5.9

NOTES: For availability of bushings and bearings, please refer to page 33.

Pulleys in the above chart are sold with an incomplete hole (cored). When machining these, care should be taken to make the bore concentric with the outside diameter. This is normally done in a lathe. Completing the bore in a drill press is not recommended because of possible misalignment and loss of concentricity. SAVA has semi-automated equipment to perform this according to your specifications.

Maximum load indicates allowable load for pulleys furnished with bearings under static load conditions. For long pulley fatigue life, a load equal to 25% or less of the maximum load column is recommended.



Type A



Type B



Type C

BORE WEAR ON LP PULLEYS WITHOUT BEARINGS

On lightly loaded applications where the working load is less than 10% of the maximum load, as shown above, it is possible to use these pulleys without bushings or antifriction bearings. Analyzing the wear characteristics, it was found that two factors directly affect the wear on bearings: pressure (P) and surface velocity (V). Working with these two factors, a relationship with the bearing wear has been developed. Tests were run on our Pulley Testing Machine with different sizes of pulleys under various load conditions. Results obtained so far are depicted in the graph below. Shafts and mating parts made from hardened and ground steel perform best, while unhardened steel surfaces will wear quickly in many applications, particularly if unlubricated. Our tests for pulley wear were run on ground shafts with no lubrication. Lubrication will reduce wear. It is difficult to estimate wear rates for lubricated bearing surfaces, since this depends, to a great extent, on the lubricant and the efficiency of its application to the bearing surface.

The following formula will predict the approximate bore wear on LP pulleys without bushings or bearings.

$$PV \text{ Factor} = P \times V$$

$$P = \frac{W}{d \times L}$$

$$V = \frac{\pi \times d \times n}{12}$$

P = Pressure in p.s.i.

W = Load on bearing in pounds

d = Diameter of bearing in inches

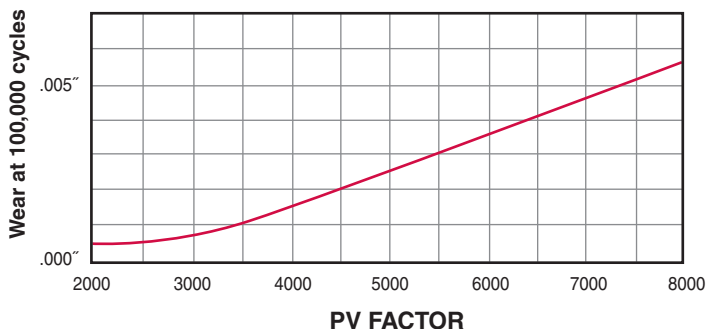
L = Width of bearing in inches

n = r.p.m.

V = Velocity in feet/min.

RECOMMENDED BORE DIMENSIONS FOR LP PULLEYS W/O BEARINGS

I.D. CODE	SHAFT DIA. INCHES	BORE DIMENSIONS + .002 - .001
1	3/8	.376
2	7/16	.439
3	1/2	.501
4	9/16	.564
5	5/8	.626
6	11/16	.689
7	3/4	.751
8	7/8	.876
9	1	1.002



GROOVE WEAR

All of our tests show insignificant groove wear when used with coated cable at the end of 500,000 cycles.



SINTERED BRONZE BUSHINGS

SAVA ITEM	DIMENSIONS		USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
	I.D.	LENGTH		
MP253825	1/4	1/4	LP0220	-
MP253844		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP253850		1/2	LP0338, LP0388	-
MP253869		11/16	LP0188	-
MP324425	5/16	1/4	LP0220	-
MP324444		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP324450		1/2	LP0338, LP0388	-
MP385025	3/8	1/4	LP0220	-
MP385044		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP385050		1/2	LP0338, LP0388, LP0438	-
MP385063		5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
MP385069		11/16	LP0188	-
MP506325	1/2	1/4	LP0220	-
MP506944		7/16	LP0200, LP0250, LP0300	OP0150, OP0200
MP506350		1/2	LP0338, LP0388, LP0438	-
MP506363		5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
MP506369		11/16	LP0188	-
MP638850	5/8	1/2	LP0338, LP0388, LP0438	-
MP631063		5/8	LP0463, LP0513, LP0525	OP0250, OP0281
MP751050	3/4	1/2	LP0338, LP0388, LP0438	-
MP751063		5/8	LP0463, LP0513, LP0525	OP0250, OP0281

LP pulleys are available with a variety of sintered, oil-impregnated, bronze bushings and with ball and needle roller bearings. The following tables show the standard sizes. For specials, please contact the factory. With bearings, these pulleys offer excellent wear properties and prolonged life using loads not exceeding the recommended limits (see note 3 on page 32). Pulleys should not be allowed to move from side to side without restraints, because the bearing might work sideways out of the bore.

STANDARD NEEDLE ROLLER BEARINGS

SAVA ITEM	TYPE	DIMENSIONS		USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
		I.D.	LENGTH		
RB254425	Unsealed	1/4	1/4	LP0220	-
RB254444	Unsealed	1/4	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB325044	Unsealed	5/16	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB385644	Unsealed	3/8	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RS385644	Sealed	3/8	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB385650	Unsealed	3/8	1/2	LP0338, LP0388, LP0438	-
RB385663	Unsealed	3/8	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RS385663	Sealed	3/8	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RB506944	Unsealed	1/2	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RS506944	Sealed	1/2	7/16	LP0200, LP0250, LP0300	OP0150, OP0200
RB506950	Unsealed	1/2	1/2	LP0338, LP0388, LP0438	-
RS506963	Unsealed	1/2	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RB506963	Sealed	1/2	5/8	LP0256, LP0463, LP0513, LP0525	OP0250, OP0281
RB638150	Unsealed	5/8	1/2	LP0338, LP0388, LP0438	-
RB638163	Unsealed	5/8	5/8	LP0463, LP0513, LP0525	OP0250, OP0281
RB751050	Unsealed	3/4	1/2	LP0338, LP0388, LP0438	-
RS751050	Sealed	3/4	1/2	LP0338, LP0388, LP0438	-
RB751063	Unsealed	3/4	5/8	LP0463, LP0513, LP0525	OP0250, OP0281
RS751063	Sealed	3/4	5/8	LP0463, LP0513, LP0525	OP0250, OP0281

NOTE: Unsealed roller bearings are protected from rust only. These should be grease lubricated before use. We suggest that bearings should be wiped with grease before installation. Sealed bearings are prelubricated.

BALL BEARINGS

SAVA ITEM	BEARING DESCRIPTION	DIMENSIONS		USED ON NYLON PULLEY PART NOS.	USED ON STEEL PULLEY PART NOS.
		I.D.	LENGTH		
SP38	Ground and Shielded	.1875 +.0005 -.0000	1/4	LP0220	-
UP38	Unground and Open	.188 +.004 -.000	1/4	LP0220	-
UP48	Unground and Open	.250 +.004 -.000	1/4	LP0220	-
UP50E	Unground and Shielded	.375 +.004 -.000	5/8 ¹	LP0338, LP0388 LP0438, LP0463 LP0513, LP0525	OP0150, OP0200 OP0250, OP0281

NOTES: ¹Includes extended inner race of .060 each side. For LP0463, LP0513, LP0525, OP0250, and OP0281, the inner race will be flush with the hub.

Bearings can be ordered as separate items if you prefer to install them or use them in another application.

Theoretical Load Rating on ball bearings is 53 lbs. at 600 RPM.

For other speeds use the conversion factor below:

- 3.6 @ 50 RPM
- 2.7 @ 100 RPM
- 1.4 @ 300 RPM
- .8 @ 900 RPM
- .7 @ 1000 RPM
- .6 @ 1200 RPM

BRACKET PULLEYS

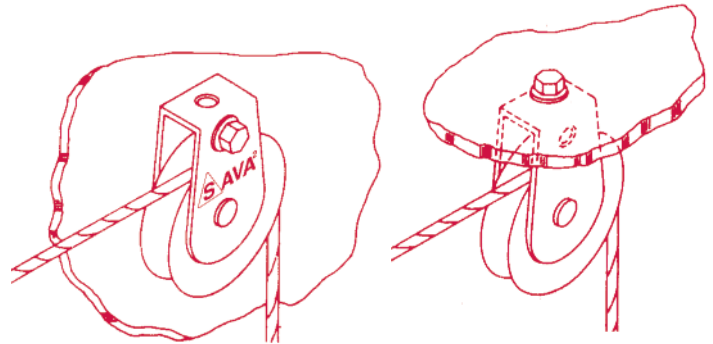
These inexpensive brackets offer the option of different size pulleys, materials, and eyes as depicted. They can be top, side or eye mounted.

How to Order:

Select and list from chart—① pulley no., ② bracket style, and ③ material; e.g. BP4061APS.



② **EYE MOUNT (Swivel Type)**
Bracket Style A



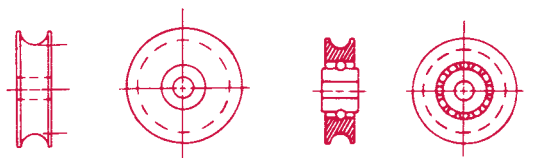
② **SIDE MOUNT OR TOP MOUNT**
Bracket Style B

① PULLEY NO (SIZE O.D.)	PULLEY TYPE (MAXIMUM CABLE DIA.)	EYE SIZE	③ MATERIAL AVAILABLE FOR BRACKET	A	B	C	D	E	F	G	H	J	K	L	M	N
BP4061 (.960)	BP4100 (1.375)	N (1/4")	Stainless Steel (SS) ¹ or Plated Steel (PS) ¹	1.65	1.00	.70	.66	.78	1.15	.37	.22	—	.05	.21	—	(1x) .19
CP4088 (1.250)	CPS4088	P (3/16")														
LP0200 (2.50)	LP0250 (3.00)	N (3/16")	Plated Steel (PS)	3.00	2.00	1.50	.78	.88	2.00	.50	.25	.53	.08	.23	(2x) .19	(2x) .19
CP6125 (1.75)	CPS6125 (2.00)	P (1/4")														

NOTES: ¹ If the material ordered is stainless steel (SS), then the bracket, eye, and rivet will be furnished in 300 Series SS Otherwise, for plated steel (PS), rivet and eye will be plated steel and the bracket will be stainless steel.

For volume customers, your name and logo can be substituted for the SAVA logo.
See catalog for pulley details.

PULLEY TYPE



MATERIAL - NYLON
TYPE N

MATERIAL - PLATED STEEL
TYPE P

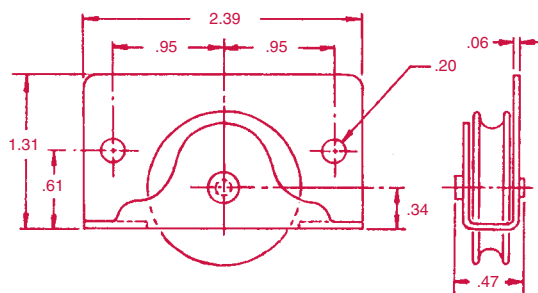
EYE SIZE



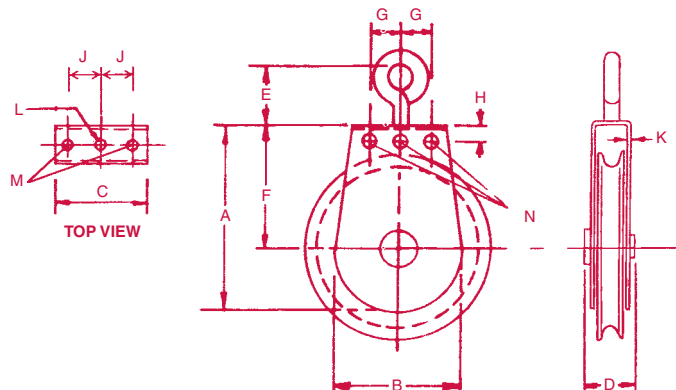
SIZE 2
500 LBS. MIN.
BREAKING STRENGTH

SIZE 3
700 LBS. MIN.
BREAKING STRENGTH

SPECIAL BRACKETS



SIDE MOUNT BRACKET STYLE C
PART NO. BP4122CAL
ALUMINUM BRACKET WITH PULLEY BP4122



MIN. STRENGTHS NOTED ABOVE ARE FOR THE BRACKET PULLEY ASSEMBLY.

NOTE: Maximum safe working load is determined by the end user. At least a 3:1 safety factor is generally advised. This is exclusive of any shock load. For volume customers, specially designed brackets can be manufactured. All dimensions are for reference only.



PULLEYS

When cable is used over pulleys, the cable life can be significantly prolonged by proper groove design. Laboratory tests prove that improper groove design reduces cable bending life to 90%. These same tests show that doubling a pulley diameter can increase cable bending life up to thirteen times. Also, pulley diameters less than fifteen rope diameters fall into a range in which cable life is relatively low.

Cable life is reduced as the groove radius changes from the contour of the cable to a flat surface. For maximum cable life, the groove should make contact with the cable on at least 1/3 of the cable circumference.

RECOMMENDED MINIMUM PULLEY DIAMETERS To Maximize Life

CABLE CONSTRUCTION	PULLEY DIAMETERS (ROPE)
3 x 7	50 times rope (uncoated dia.)
7 x 7	40 times rope (uncoated dia.)
7 x 19	25 times rope (uncoated dia.)
7 x 49	15 times rope (uncoated dia.)

HOW PULLEY SIZE AFFECTS CABLE STRENGTH

The radius of bend has an affect on the strength of cable. In order to take this into account in selecting the size pulley to be used with a given diameter cable, the following table can be used as a guide:

RATIO "A" = PULLEY DIA. / CABLE DIA.	STRENGTH EFFICIENCY COMPARED TO CATALOG STRENGTH IN %
40	95
30	93
20	91
15	89
10	86
8	83
6	79
4	75
2	65
1	50

FOR EXAMPLE: Using a .030" dia. cable with a .600" dia. pulley. Ratio "A" = .600 ÷ .030 = 20 and the strength efficiency = 91% as compared to the catalog strength of the cable.

SALES POLICY AND TERMS

FITTINGS—Most cable fittings shown in this catalog are available in prototype packages of 25 pieces for those who wish to make their own initial assemblies. However, many require special tooling which is expensive to develop. We recommend that you ask SAVA to quote you on your requirements.

PULLEYS—Pulleys are available from stock. Some are sold in prototype packages.

CABLE—Most cables shown are in stock and are sold in minimum quantities of 250 feet. Some cables are made to order since the demand is infrequent. For cables made to order, the minimum order quantity is normally 1000 feet and SAVA will ship the yield of the manufacturing run.

WARRANTY

All products sold by Carl Stahl Sava Industries, Inc. are guaranteed against manufacturing defects. Any item found to be defective will be replaced or an adjustment made provided that we are notified promptly upon receipt. An item is considered defective only if it fails to meet specifications set forth in the purchaser's Purchase Order or other specifications published by the Company. We reserve the right to request that an item be returned to us for examination; we are not responsible for any labor or other charges incurred in replacement of any item. In no event shall our liability for any defective product exceed its replacement cost to us. THE COMPANY EXPRESSLY DISCLAIMS ANY AND ALL RESPONSIBILITY OR LIABILITY FOR THE PERFORMANCE OF ANY PRODUCT INTO WHICH THE COMPANY'S PRODUCTS ARE INTEGRATED OR ASSEMBLED AND PURCHASER AGREES TO HOLD THE COMPANY HARMLESS AGAINST ANY SUCH LIABILITY. THE COMPANY MAKES NO OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THE COMPANY SHALL NOT BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES.

CERTIFICATIONS—Unless specified on the quotation, prices do not include the preparation of certifications or any other documentation that may be required by purchaser. Please contact factory, as additional fees may apply.

CREDIT AND PAYMENT TERMS—Net 30 payment terms will be extended to firms with a satisfactory commercial rating. To avoid delay in servicing an order, we will ship COD when proper credit information is not available. Unless otherwise noted, prices are quoted FOB shipping point.

MINIMUM BILLING—\$250.00 minimum order size.

RETURNED CHECK CHARGE—\$25.00

RETURNED MERCHANDISE—All material that is not the subject of a request for return authorization within thirty (30) days of shipment shall be deemed accepted by the customer. Credit will not be issued for material returned without authorization from us. All returned std. items in satisfactory condition are subject to a handling charge of 20%. Contact factory for a return authorization number. Items manufactured to customer's specifications may not be returned.

TOOLS AND CUTTERS—Are not returnable.

SPECIFICATIONS—The dimensions, weights, lengths, strengths, and other specifications shown in this catalog are for reference only and subject to variation within reasonable tolerances and subject to change without notice.

ACCEPTANCE OF ORDERS—All orders are subject to acceptance by our home office. We are not responsible for delays or nonfulfillment due to riot, fire, floods, strikes or other causes beyond our control. Prices are based on costs and conditions existing on the date of quotation and are subject to change by the seller before final acceptance by seller. Unless otherwise agreed upon, purchaser agrees to accept and pay for quantities ±5% of the total quantity ordered. Quoted delivery is subject to prior sales.

BLANKET ORDERS—A blanket order is a firm contract for acceptance of the total quantity ordered, to be delivered over time. All blanket orders are to be shipped complete and accepted within one year of the date of the order. In the event that the complete order is not accepted by purchaser within one year, the price may revert to that for the quantity taken and the purchaser will be responsible for the difference, along with cancellation charges and charges for material and work in process and/or in final inventory.