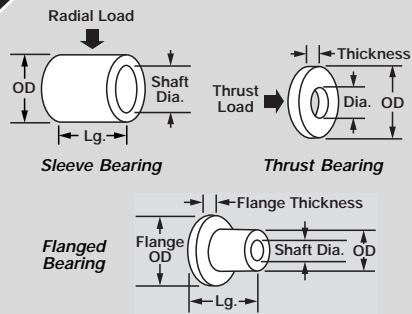


About Plain Bearings, P max, V max, and PV max



Plain bearings allow smooth, low-friction motion between two surfaces. The term "plain" simply means the load is supported through sliding motion between two solid surfaces (no moving parts such as ball bearings).

Sleeve bearings support loads perpendicular to their rotating axis (i.e. radial loads). **Thrust bearings** support loads parallel to their axis of rotation (i.e. thrust loads). **Flanged bearings** do the work of both sleeve and thrust bearings, handling radial and thrust loads.

For Shaft Hardness—Use bearing materials suitable for your shaft hardness. Usually, the harder and smoother the shaft, the longer the bearing will last. Some bearing materials will damage soft shaft materials. Use only with hard shafting.

Shaft Hardness		Rockwell Hardness
Example		
Hard	Hardened Steel	R _C 35 and higher
Medium	Mild Steel	R _B 85 to R _C 35
Soft	Aluminum	Lower than R _B 85

P max—The maximum load a bearing can carry at 0 rpm.

Formula: Maximum bearing load (psi for inch sizes; N/mm² for metric) = P max × bearing length × shaft diameter

To convert psi to N/mm², multiply psi value by 0.006894757. To convert N/mm² to psi, multiply N/mm² value by 145.032.

V max—The maximum velocity or speed (based on the maximum shaft rpm) that a bearing can carry at light loads. For inch bearings, maximum velocity is stated in surface feet per minute (fpm). For metric bearings, it is meters per second (m/s). To convert fpm to m/s, multiply fpm value by 0.00508. To convert m/s to fpm, multiply m/s value by 196.8504.

Formula: Maximum shaft rpm = $\frac{V \text{ max}}{\text{Constant (0.262 for inch sizes; 19098.593 for metric)} \times \text{Shaft diameter}}$

PV max—Once you've selected a bearing based on P max and V max, use PV max (shown with product listings) as the final check to ensure that the bearing can sustain your combined load and speed requirements. If actual PV is less than PV max, the bearing should fit your application.

Formula: Actual PV = $\left(\frac{\text{Actual load (lbs. for inch sizes; Newtons for metric)}}{\text{Bearing length} \times \text{Shaft diameter}} \right) \times \left(\frac{\text{Actual rpm}}{\text{Constant (0.262 for inch sizes; 19098.593 for metric sizes)}} \right) \times \left(\frac{\text{Shaft diameter}}{\text{Constant (0.262 for inch sizes; 19098.593 for metric sizes)}} \right)$

Bronze Plain Sleeve Bearings

Bronze Sleeve Bearings



For Shaft Dia. Tolerance

For Shaft Dia.	Tolerance
SAE 841	
1/8"–1 1/2"	+0.000" to –.001"
1 3/4"–2 1/2"	+0.000" to –.0015"
3"	+0.000" to –.002"
SAE 660	
All	±.0010"
Metric SAE 841	
All	+0.006 to +0.024 mm
Metric SAE 660	
All	±.0254 mm

OD Tolerance

OD	Tolerance
SAE 841	
1/4"–1 5/8"	+0.000" to –.001"
1 3/4"–2 3/4"	+0.000" to –.0015"
3"–3 1/2"	+0.000" to –.002"
4"	+0.000" to –.003"
SAE 660	
1/4"–3"	+0.002" to +0.003"
3 1/2"–4"	+0.003" to +0.005"
Metric SAE 841	
15–18 mm	+0.028 to +0.046 mm
19–22 mm	+0.035 to +0.056 mm
Metric SAE 660	
All	+0.0508 mm to +0.0762 mm

Length Tolerance

Length	Tolerance
SAE 841	
1/8"–1 1/2"	±.005"
1 3/4"–3"	±.0075"
4"	±.010"
5"–6"	±.015"
6 1/2"	Not rated
SAE 660	
All	±.005"
Metric SAE 841	
All	±1%
Metric SAE 660	
All	±.1270 mm

SAE 841 Bronze—Similar to Oilite-style bushings with an alloy of copper, tin, and carbon, these porous sintered bronze bearings are vacuum-impregnated with 18-20% SAE-30 oil. Heat created by shaft movement draws the oil to bearing surface. The oil acts as a cushion between the shaft and bearing, reducing wear and increasing resistance to shock loads.

SAE 660 Bronze—An alloy of copper, tin, lead, and zinc, these nonporous bearings resist shock loads and wear. High-temperature lubricants are recommended over 250° F.

Bearing Material	Temperature Range	For Shaft Hardness	P max	V max	PV max
SAE 841	10° to 220° F	Medium and up	2,000	1,200	50,000
SAE 660	10° to 450° F	Medium and up	4,000	750	75,000
Metric SAE 841	10° to 220° F	Medium and up	13.79	6.10	1.75
Metric SAE 660	10° to 450° F	Medium and up	27.58	3.81	2.7

Lg.	SAE 841		SAE 660	
	Each	Each	Each	Each
For Shaft Dia.: 1/8"; Bearing OD: 1/4"				
1/8"	6391K113	\$0.33	6381K405	\$3.89
1/4"	6391K111	.30	6381K406	3.94
3/8"	6391K112	.33	6381K407	4.00
For Shaft Dia.: 3/8"; Bearing OD: 1/2"				
1/4"	6391K122	.30	6381K501	3.94
3/8"	6391K125	.33	6381K502	3.97
1/2"	6391K124	.37	6381K503	4.03
5/8"	6391K123	.37	6381K601	4.09
For Shaft Dia.: 1/2"; Bearing OD: 5/8"				
1/4"	6391K114	.30	6381K602	3.94
3/8"	6391K115	.27	6381K603	4.00
1/2"	6391K116	.27	6381K408	1.13
For Shaft Dia.: 1/4"; Bearing OD: 5/8"				
1/4"	6391K126	.23	6381K409	3.94
1/2"	6391K127	.37	6381K410	4.03
3/4"	6391K401	.40	6381K411	4.14
For Shaft Dia.: 1/4"; Bearing OD: 3/8"				
1/4"	6391K131	.37	6381K412	.87
3/8"	6391K136	.40	6381K413	.98
1/2"	6391K132	.43	6381K415	1.13
5/8"	6391K133	.43	6381K416	4.11
7/8"	6391K134	.43	6381K417	4.20
1"	6391K135	.43	6381K42	1.47

Lg.	SAE 841		SAE 660	
	Each	Each	Each	Each
For Shaft Dia.: 1/4"; Bearing OD: 1/2"				
1/2"	6391K141	\$0.53	6381K421	\$4.20
5/8"	6391K402	.63	6381K422	4.29
3/4"	6391K142	.67	6381K423	4.34
1"	6391K143	.73	6381K424	4.49
For Shaft Dia.: 5/8"; Bearing OD: 3/8"				
1/4"	6391K403	.37	6381K425	3.94
3/8"	6391K152	.37	6381K426	3.97
1/2"	6391K153	.37	6381K427	4.03
5/8"	6391K154	.40	6381K428	4.09
3/4"	6391K155	.40	6381K429	4.14
1"	6391K156	.77	6381K43	4.26
For Shaft Dia.: 5/8"; Bearing OD: 7/8"				
1/4"	6391K161	.23	6381K431	4.03
3/8"	6391K162	.27	6381K442	1.00
1/2"	6391K163	.33	6381K443	1.18
5/8"	6391K164	.39	6381K444	4.26
3/4"	6391K165	.43	6381K445	1.36
1"	6391K166	.47	6381K446	1.52
For Shaft Dia.: 5/8"; Bearing OD: 1/2"				
3/8"	6391K404	.50	6381K447	4.11
1/2"	6391K405	.50	6381K448	4.20
3/4"	6391K406	.57	6381K101	1.49
1"	6391K403	.67	6381K102	1.69
1 1/4"	6391K444	.94	6381K103	1.91

Lg.	SAE 841		SAE 660	
	Each	Each	Each	Each
For Shaft Dia.: 3/8"; Bearing OD: 1/2"				
1/4"	6391K171	\$0.27	6381K449	\$4.03
3/8"	6391K172	.30	6381K45	1.00
1/2"	6391K173	.33	6381K451	1.18
5/8"	6391K174	.40	6381K452	4.26
3/4"	6391K176	.70	6381K453	1.36
7/8"	6391K175	.53	6381K454	4.40
1"	6391K178	.50	6381K455	1.49
1 1/4"	6391K179	.52	6381K456	1.62
For Shaft Dia.: 3/8"; Bearing OD: 9/8"				
3/8"	6391K181	.39	6381K457	4.26
1/2"	6391K182	.43	6381K458	4.37
3/4"	6391K183	.52	6381K459	1.49
1"	6391K184	.70	6381K46	1.65
1 1/4"	6391K185	.73	6381K461	1.88
For Shaft Dia.: 3/8"; Bearing OD: 5/8"				
1/2"	6391K186	.60	6381K462	4.37
5/8"	6391K187	.50	6381K463	4.46
3/4"	6391K188	.60	6381K464	1.52
1"	6391K189	.87	6381K606	1.70
For Shaft Dia.: 7/8"; Bearing OD: 9/8"				
1/2"	6391K117	.40	6381K607	4.34
5/8"	6391K118	.33	6381K608	4.46
1"	6391K119	.53	6381K609	1.70
1 1/4"	6391K407	.97	6381K61	1.95

(Continued on following page)