



SELECTION

GRIP TIGHT Adapter Ball Bearings

DODGE mounted ball bearings are primarily designed for radial loading. However, they have the capacity to carry thrust loads and combined radial/thrust loads. The maximum recommended load which can be applied is limited by various components in the system, such as bearing, housing, shaft attachments, speed and life requirements. DODGE mounted ball bearings have been applied successfully when these limits have been exceeded under controlled operating conditions. Contact DODGE Engineering for applications which exceed these recommendations.

Select a bearing from the Selection Chart that has a radial load rating at the operating speed equal to or greater than the calculated Equivalent Radial load for a desired L₁₀ life. This simple method is all that is required for the majority of general applications and provides for occasional average shock loads.

L₁₀ Hours Life-is the life which may be expected for at least 90% of a given group of bearings operating under identical conditions. For an L₁₀ hours life other than those listed in the Selection Chart, multiply the equivalent Radial load by one of the following factors. For 50,000 L₁₀ hours life, use a factor of 1.18 and for 80,000, use 1.39. Then select a bearing from the bold face (30,000) L₁₀ ratings only in the Selection Chart that has a rating equal to or greater than this value.

Heavy Service-For heavy shock loads, frequent shock loads or severe vibrations, add up to 50% (according to severity of conditions) to the Equivalent Radial Load to obtain a Modified Equivalent Radial Load. Consult Application Engineering for additional selection assistance.

A thrust load value of C/10 is recommended as a guide for general applications and will give adequate L₁₀ life. Where substantial radial load pulls the housing away from the mounting base, both the hold-down bolts and housing must be of adequate strength. Auxiliary load carrying devices, such as shear bars, are advisable for side or end-loading of pillow blocks and radial loads for flange units.

To determine the L₁₀ hours life for loads and RPM's not listed use the following equation:

$$L_{10} = \left(\frac{C}{P}\right)^3 \times \frac{16,667}{N}$$

Where:

L₁₀ = Life, hours

C = Dynamic Capacity, lbs. or N

P = Equivalent Radial Load, lbs. or N

N = Revolutions per minute

When the load on a ball bearing is solely a radial load with no thrust (axial) load, the Equivalent Radial Load (P) is equal to the actual radial load. However, when a thrust (axial) load is applied, the radial and thrust loads applied must be converted into an Equivalent Radial Load. The use of the X (radial factor) and Y (thrust factor) from Table 1 convert the actual applied thrust and radial loads to an Equivalent Radial Load which has the same effect on the life of a bearing as a radial load of this magnitude.

$$P = (X \times F_R) + (Y \times F_A)$$

Where:

P = Equivalent Radial Load, lbs.

F_R = Radial load, lbs.

F_A = Thrust load, lbs.

e = Thrust load to radial load factor (Table 1)

X = Radial load factor (Table 1)

Y = Thrust Factor (Table 1)

C₀ = Basic static capacity

To find X and Y, first calculate F_A/C₀ to determine e. Calculate F_A/F_R and compare to e to determine the X and Y factors to use from Table 1.

Substitute all known values into the Equivalent Radial Load equation. The Equivalent Radial loads (P) thus determined can be used in the L₁₀ life formula or compared to the allowable Equivalent Radial Load rating desired in the expanded rating chart to select a bearing (Table 2).

If calculated value of P is less than F_R, use P=F_R.

Table 1:

F _A / C ₀	e	Radial/Thrust Factors			
		If F _A /F _R is equal to or less than e		If F _A /F _R is greater than e	
		F _A /F _R ≤ e		F _A /F _R > e	
		X	Y	X	Y
0.014	0.19	1	0	0.56	2.30
0.021	0.21	1	0	0.56	2.15
0.028	0.22	1	0	0.56	1.99
0.042	0.24	1	0	0.56	1.85
0.056	0.26	1	0	0.56	1.71
0.070	0.27	1	0	0.56	1.63
0.084	0.28	1	0	0.56	1.55
0.110	0.30	1	0	0.56	1.45
0.170	0.34	1	0	0.56	1.31
0.280	0.38	1	0	0.56	1.15
0.420	0.42	1	0	0.56	1.04
0.560	0.44	1	0	0.56	1.00

Lubrication-DODGE Ball Bearings are lubricated at the factory and are ready to run. The bearings are initially lubricated with a lithium complex based grease and should be relubricated with the same or some equivalent. For high speeds, high loads, extreme temperatures and other abnormal operating conditions, special greases may be required. Contact DODGE Application Engineering for recommendations on these types of applications.

Misalignment-DODGE Ball Bearings are designed to allow a maximum of ± 2° static misalignment. These bearings are not suitable for dynamic misalignment. To ensure good alignment, mounting surfaces must be checked for flatness and must lie in the same plane. When tightening base bolts, each bolt should be alternately tightened in incremental torque values until full torque is achieved to prevent the angular shifting of the pillow block that occurs when one bolt is tightened to its full torque. Shimming may be required to minimize misalignment.

Suggested Lubrication Intervals in Weeks

Hours Run Per Day	RPM							
	1 to 250	251 to 500	501 to 750	751 to 1000	1001 to 1500	1501 to 2000	2001 to 2500	2501 to Max.
8	12	12	10	7	5	4	3	2
16	12	7	5	4	2	2	1	1
24	10	5	3	2	1	1	1	1

Shaft Tolerances

Normal Shaft Size Inches	Commercial Shaft Tolerances Inches	Recommended Shaft Tolerances GRIP TIGHT Ball Bearings Inches
Up to 1-1/2	+0.000 -0.002	+0.000 -0.002
Over 1-1/2" to 2-1/2	+0.000 -0.003	+0.000 -0.003
Over 2-1/2	+0.000 -0.004	+0.000 -0.004

Note: Bearing analysis program "BEST" is available on www.ptwizard.com

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SELECTION

GRIP TIGHT Adapter Ball Bearings

Table 2: Easy Selection Table

Ring Size	Shaft Size		Dynamic Capacity C (Lbs)	Static Capacity Co (Lbs)	Max RPM		L ₁₀ Life Hours	Allowable Equivalent Radial Load Ratings (Lbs.) At Various RPM												
	GT	GTM			Proguard Plus (Contact) Seal	Labyrinth (LL) Seal		50	150	250	500	750	1,000	1,500	1,750	2,200	2,600	3,000	3,200	3,600
203	1/2 5/8 17mm	-	2,158	1079	12,000	14,500	20,000	551	382	322	256	224	203	177	169	156	148	141	138	133
							30,000	482	334	282	224	195	177	155	147	136	129	123	120	116
							40,000	438	303	256	203	177	161	141	134	124	117	112	109	105
							60,000	382	265	224	177	155	141	123	117	108	102	98	96	92
204	3/4 20mm	-	2,899	1482	10,000	13,000	20,000	741	513	433	344	300	273	238	226	210	198	189	185	178
							30,000	647	449	378	300	262	238	208	198	183	173	165	162	155
							40,000	588	408	344	273	238	217	189	180	166	157	150	147	141
							60,000	513	356	300	238	208	189	165	157	145	138	131	128	123
205	7/8 15/16 1 25mm	3/4	3,146	1769	9,000	12,000	20,000	804	557	470	373	326	296	259	246	228	215	205	201	193
							30,000	702	487	411	326	285	259	226	215	199	188	179	176	169
							40,000	638	442	373	296	259	235	205	195	181	171	163	159	153
							60,000	557	386	326	259	226	205	179	170	158	149	142	139	134
206	1-1/8 1-3/16 1-1/4 30mm	1 25mm	4,368	2538	7,500	11,000	20,000	1,116	774	652	518	452	411	359	341	316	299	285	279	268
							30,000	975	676	570	452	395	359	314	298	276	261	249	244	234
							40,000	886	614	518	411	359	326	285	271	251	237	226	221	213
							60,000	774	536	452	359	314	285	249	237	219	207	198	193	186
207	1-1/4 1-3/8 1-7/16 35mm	1-3/16 1-1/4 30mm	5,759	3461	6,300	9,500	20,000	1,471	1,020	860	683	596	542	473	450	417	394	376	368	354
							30,000	1,285	891	752	596	521	473	414	393	364	344	328	321	309
							40,000	1,168	810	683	542	473	430	376	357	331	313	298	292	281
							60,000	1,020	707	596	473	414	376	328	312	289	273	261	255	245
208	1-1/2 40mm	1-7/16 1-1/2** 35mm	7,332	4475	5,600	8,500	20,000	1,873	1,299	1,095	869	759	690	603	573	531	502	478	468	450
							30,000	1,636	1,134	957	759	663	603	527	500	463	438	418	409	393
							40,000	1,487	1,031	869	690	603	548	478	454	421	398	380	372	357
							60,000	1,299	900	759	603	527	478	418	397	368	348	332	325	312
209	1-5/8 1-14/16 1-3/4 45mm	1-1/2 40mm	7,891	4906	5,300	8,000	20,000	2,016	1,398	1,179	936	817	743	649	616	571	540	515	504	485
							30,000	1,761	1,221	1,030	817	714	649	567	538	499	472	450	440	423
							40,000	1,600	1,109	936	743	649	589	515	489	453	429	409	400	385
							60,000	1,398	969	817	649	567	515	450	427	396	374	357	349	336
210	1-15/16 2 50mm	1-11/16 1-3/4 45mm	7,891	5213	4,800	7,500	20,000	2,016	1,398	1,179	936	817	743	649	616	571	540	515	504	485
							30,000	1,761	1,221	1,030	817	714	649	567	538	499	472	450	440	423
							40,000	1,600	1,109	936	743	649	589	515	489	453	429	409	400	385
							60,000	1,398	969	817	649	567	515	450	427	396	374	357	349	336
211	2 2-3/16 55mm	1-15/16 2 50mm	9,755	6588	4,300	6,700	20,000	2,492	1,728	1,457	1,157	1,010	918	802	762	706	668	636	623	599
							30,000	2,177	1,509	1,273	1,010	883	802	701	665	617	583	556	544	523
							40,000	1,978	1,371	1,157	918	802	729	636	605	560	530	505	494	475
							60,000	1,728	1,198	1,010	802	701	636	556	528	489	463	441	432	415
212	2-1/4 2-7/16 60mm	2-3/16 2-1/4 55mm	11,791	8100	4,000	6,000	20,000	3,012	2,088	1,761	1,398	1,221	1,110	969	921	853	807	769	753	724
							30,000	2,631	1,824	1,539	1,221	1,067	969	847	804	745	705	672	658	632
							40,000	2,391	1,657	1,398	1,110	969	881	769	731	677	640	611	598	575
							60,000	2,088	1,448	1,221	969	847	769	672	638	592	559	533	522	502
214	2-11/16 70mm	2-7/16 2-1/2 65mm	13,995	9838	3,600	5,000	20,000	3,575	2,479	2,091	1,659	1,450	1,317	1,150	1,093	1,013	958	913	894	859
							30,000	3,123	2,165	1,826	1,450	1,266	1,150	1,005	955	885	837	798	781	751
							40,000	2,837	1,967	1,659	1,317	1,150	1,045	913	867	804	760	725	709	682
							60,000	2,479	1,719	1,450	1,150	1,005	913	798	758	702	664	633	620	596
215	2-15/16 75mm	2-11/16 70mm	14,872	11108	3,200	4,800	20,000	3,799	2,634	2,222	1,763	1,540	1,400	1,223	1,161	1,076	1,018	970	950	913
							30,000	3,319	2,301	1,941	1,540	1,346	1,223	1,068	1,015	940	889	848	830	798
							40,000	3,015	2,091	1,763	1,400	1,223	1,111	970	922	854	808	770	754	725
							60,000	2,634	1,826	1,540	1,223	1,068	970	848	805	746	706	673	658	633
216	-	2-15/16 3 75mm	17,407	13102	3,000	4,500	20,000	4,446	3,083	2,600	2,064	1,803	1,638	1,431	1,359	1,259	1,191	1,136	1,112	1,069
							30,000	3,884	2,693	2,272	1,803	1,575	1,431	1,250	1,187	1,100	1,041	992	971	934
							40,000	3,529	2,447	2,064	1,638	1,431	1,300	1,136	1,079	1,000	946	901	882	848
							60,000	3,083	2,138	1,803	1,431	1,250	1,136	992	942	873	826	788	771	741
218	-	3-7/16 3-1/2 85mm	21,451	16641	2,600	3,800	20,000	5,479	3,799	3,204	2,543	2,222	2,019	1,763	1,675	1,552	1,468	1,400	1,370	1,317
							30,000	4,787	3,319	2,799	2,222	1,941	1,763	1,541	1,463	1,356	1,282	1,223	1,197	1,151
							40,000	4,349	3,015	2,543	2,019	1,763	1,602	1,400	1,330	1,232	1,165	1,111	1,087	1,045
							60,000	3,799	2,634	2,222	1,763	1,541	1,400	1,223	1,161	1,076	1,018	970	950	913
							100,000	3,204	2,222	1,874	1,487	1,299	1,181	1,031	980	908	859	819	801	770

** Piloted flange Only

Labyrinth seal required when operating in the shaded area

Note: Bearing analysis program "BEST" is available on www.ptwizard.com

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GRIP TIGHT Adapter Ball Bearings

Table 2: Easy Selection Table

Ring Size	Shaft Size		L ₁₀ LIFE Hours	Allowable Equivalent Radial Load Ratings (Lbs.) At Various RPM																					
	GT	GTM		3,800	4,000	4,300	4,500	4,800	5,000	5,300	5,600	6,000	6,300	6,700	7,500	8,000	8,500	9,000	9,500	10,000	11,000	12,000	13,000	14,500	
203	1/2 5/8 17mm	-	20,000	130	128	125	123	120	119	116	114	112	110	108	104	102	100	98	96	94	91	89	86	83	
			30,000	114	112	109	107	105	104	102	100	98	96	94	91	89	87	85	84	82	80	77	75	73	
			40,000	103	102	99	98	96	94	92	91	89	87	85	82	81	79	77	76	75	72	70	69	66	66
			60,000	90	89	87	85	83	82	81	79	77	76	75	72	70	69	68	66	65	63	62	60	58	58
			100,000	76	75	73	72	70	69	68	67	65	64	63	61	59	58	57	56	55	53	52	51	49	
204	3/4 20mm	-	20,000	175	172	168	165	162	160	156	154	150	148	145	139	136	134	131	129	127	123	119	116	116	
			30,000	153	150	147	144	141	139	137	134	131	129	126	122	119	117	115	111	108	106	104	102	101	
			40,000	139	136	133	131	128	127	124	122	119	117	115	111	108	106	104	102	101	97	95	92	92	92
			60,000	121	119	116	115	112	111	108	107	104	102	100	97	95	93	91	89	88	85	83	80	80	80
			100,000	102	101	98	97	95	93	92	90	88	86	85	82	80	78	77	75	74	72	70	68	68	
205	7/8 15/16 1 25mm	3/4	20,000	190	187	182	179	176	173	170	167	163	160	157	151	148	145	142	140	137	133	129	129	129	
			30,000	166	163	159	157	153	151	148	146	142	140	137	132	129	128	124	122	122	120	117	116	113	
			40,000	151	148	145	142	139	137	135	132	129	127	125	120	117	115	113	111	109	106	103	103	103	103
			60,000	132	129	126	124	122	120	118	116	113	111	109	105	103	101	99	97	95	92	90	88	87	87
			100,000	111	109	106	105	103	101	99	97	95	94	92	88	87	85	83	82	80	78	76	76	76	
206	1-1/8 1-3/16 1-1/4 30mm	1 25mm	20,000	263	259	253	249	244	240	236	231	226	223	218	210	206	201	198	194	191	185	185	185	185	
			30,000	230	226	221	217	213	210	206	202	198	194	190	183	180	176	173	170	167	161	161	161	161	
			40,000	209	206	201	198	193	191	187	184	180	177	173	167	163	160	157	154	151	147	147	147	147	147
			60,000	183	180	175	173	169	167	163	160	157	154	151	146	143	140	137	135	132	128	128	128	128	128
			100,000	154	151	148	146	143	141	138	135	132	130	128	123	120	118	116	112	108	108	108	108	108	
207	1-1/4 1-3/8 1-7/16 35mm	1-3/16 1-1/4 30mm	20,000	347	341	333	328	321	317	311	305	298	293	287	277	271	266	261	256	256	256	256	256	256	
			30,000	303	298	291	287	281	277	272	267	261	256	251	242	237	232	228	224	224	224	224	224	224	
			40,000	276	271	265	261	255	252	247	242	237	233	228	220	215	211	207	203	203	203	203	203	203	203
			60,000	241	237	231	228	223	220	216	212	207	203	199	192	188	184	181	177	177	177	177	177	177	177
			100,000	203	200	195	192	188	185	182	178	174	172	168	162	158	155	152	150	150	150	150	150	150	
208	1-1/2 40mm	1-7/16 1-1/2** 35mm	20,000	442	435	424	418	409	403	396	389	380	374	366	352	345	338	332	328	328	328	328	328	328	
			30,000	386	380	371	365	357	352	346	339	332	326	320	308	301	295	295	295	295	295	295	295	295	
			40,000	351	345	337	332	325	320	314	308	301	297	290	280	274	268	268	268	268	268	268	268	268	268
			60,000	307	301	294	290	284	280	274	269	263	259	254	244	239	234	234	234	234	234	234	234	234	234
			100,000	259	254	248	244	239	236	231	227	222	218	214	206	202	198	198	198	198	198	198	198		
209	1-5/8 1-11/16 1-3/4 45mm	1-1/2 40mm	20,000	476	468	457	450	440	434	426	418	409	402	394	379	371	364	357	351	344	331	324	324	324	
			30,000	416	409	399	393	385	379	372	365	357	351	344	331	324	317	311	304	297	290	283	276	270	
			40,000	378	371	362	357	349	345	338	332	324	319	313	301	295	295	295	295	295	295	295	295	295	295
			60,000	330	324	317	312	305	301	295	290	283	279	273	263	257	257	257	257	257	257	257	257	257	257
			100,000	278	274	267	263	257	254	249	245	239	235	230	222	217	217	217	217	217	217	217	217		
210	1-15/16 2 50mm	1-11/16 1-3/4 45mm	20,000	476	468	457	450	440	434	426	418	409	402	394	379	371	364	357	351	344	331	324	324	324	
			30,000	416	409	399	393	385	379	372	365	357	351	344	331	324	317	311	304	297	290	283	276	270	
			40,000	378	371	362	357	349	345	338	332	324	319	313	301	295	295	295	295	295	295	295	295	295	295
			60,000	330	324	317	312	305	301	295	290	283	279	273	263	257	257	257	257	257	257	257	257	257	257
			100,000	278	274	267	263	257	254	249	245	239	235	230	222	217	217	217	217	217	217	217	217		
211	2 2-3/16 55mm	1-15/16 2 50mm	20,000	588	578	565	556	544	537	527	517	505	497	487	477	467	457	447	437	427	417	407	397	387	
			30,000	514	505	493	486	475	469	460	452	441	434	425	415	405	395	385	375	365	355	345	335	325	
			40,000	467	459	448	441	432	426	418	410	401	394	386	376	366	356	346	336	326	316	306	296	286	
			60,000	408	401	391	386	377	372	365	358	350	345	338	328	318	308	298	288	278	268	258	248	238	
			100,000	344	338	330	325	318	314	308	302	295	291	285	275	265	255	245	235	225	215	205	195		
212	2-1/4 2-7/16 60mm	2-3/16 2-1/4 55mm	20,000	711	699	682	672	658	649	636	625	611	601	591	581	571	561	551	541	531	521	511	501	491	
			30,000	621	611	596	587	575	567	556	546	533	523	513	503	493	483	473	463	453	443	433	423		
			40,000	564	555	542	533	522	515	505	496	485	475	465	455	445	435	425	415	405	395	385	375	365	
			60,000	493	485	473	466	456	450	441	433	423	413	403	393	383	373	363	353	343	333	323	313	303	
			100,000	416	409																				