

# Thin-Section Angular Contact Ball Bearings

# TIMKEN

## High Precision and Increased Axial Stiffness

Semiconductor processing requires accurate and reliable robotics. The high-speed, repetitive motions of robotic joints demand bearings that maximize the machine's speed and agility. Timken® angular contact ball bearings keep the line moving, while offering increased accuracy due to higher-precision tolerances.

The need of a radar antenna to move smoothly is critical. Just as important is minimizing maintenance investment. Limited or difficult access can drive the need for greater reliability. Timken angular contact bearings in duplex arrangements manage these issues – offering bi-directional stiffness with precision movement, and dependable performance to help reduce service visits.

Timken angular contact ball bearings maximize the ball complement to increase axial stiffness and thrust capacity. They are available in pre-loaded duplex sets to lower torque and increase stiffness. Numerous size, material and separator options are available to match specific customer needs.

Timken's advanced thin-section bearing technology gives designers of precision equipment robust solutions for compact space requirements and similar challenges.

### Thin-Section Features

**Precision tolerances** – meet ABEC 5 or 7 (ISO P5 or P4) standards for better fit with high running accuracy and consistent operation.

**Material selection** – performance options of 440C stainless steel or 52100 chrome steel offer corrosion resistance in challenging environments.

**Superfinished raceways** – provide a smooth surface finish of  $< 0.08 \mu\text{m}$  ( $3 \mu\text{in}$ ) Ra to reduce internal friction and vibration.

**High-quality ball complement** – delivers smooth rolling performance with Grade 5 or better balls optimized for minimum non-repeatable runout and low torque.

**Broad size range** – provides unique thin-section designs and superior performance up to 300 mm (12 in.) outside diameter in standard product.

**Compact size** – saves weight and space for both bearing and mating components, helping to reduce overall envelope dimensions.

**Duplexing capability** – preloaded pairs further increase capacity and stiffness.

**Low torque design** – minimizes friction and helps to reduce energy input requirements.

**Superior Timken quality** – More than a century of bearing expertise and continual technological advances.



### Typical Applications

- *Precision Robotics*
- *Guidance Systems*
- *Aerospace Systems*
- *Instrument Gimbals*

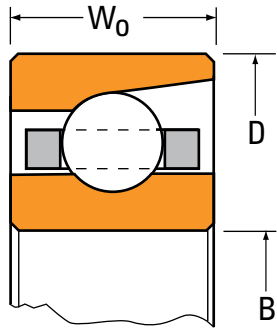
### Also Available – Thin-Section Deep-Groove Ball Bearings

- *Potential weight savings over angular contact bearings*
- *Average speed and moderate loads in any direction*



# THIN-SECTION BALL BEARINGS

## Angular Contact Bearings



Standard thin-section angular contact bearings are available with the following to meet your application requirements:

### Materials

- 440C stainless steel
- 52100 chrome steel

### Separators

- One-piece snap type phenolic retainer (up to chassis size 80-96)
- PTFE spacers

### Tolerances

- ABEC 5 (ISO P5)
- ABEC 7 (ISO P4)

### Preload

- Multiple preloads available

### Mountings/Sets

- Back-to-Back
- Face-to-Face
- Tandem

To learn about additional custom options, contact your Timken sales representative.

Chassis	B Bore mm/in.	D O.D. mm/in.	W <sub>0</sub> Width mm/in.	Load Ratings				Approx. Weight g/oz.
				Radial		Thrust		
				Static kg/lbs.	Dyn. kg/lbs.	Static kg/lbs.	Dyn. kg/lbs.	
64-80	101.60 4.000	127.00 5.000	12.70 0.500	2215 4883	1713 3776	1693 3732	1933 4261	328.9 11.6
68-76	107.95 4.25	120.65 4.75	6.35 0.25	1217 2684	657 1449	837 1845	743 1639	82.5 2.9
68-78	107.95 4.25	123.83 4.875	7.94 0.3125	1473 3246	888 1959	1049 2313	1007 2220	130.2 4.6
68-80	107.95 4.250	127.00 5.000	9.53 0.375	1778 3919	1161 2561	1301 2869	1307 2881	190.3 6.7
68-84	107.95 4.250	133.35 5.250	12.70 0.500	2331 5139	1740 3836	1774 3912	1964 4330	346.8 12.2
72-80	114.30 4.500	127.00 5.000	6.35 0.250	1277 2815	666 1469	876 1931	754 1663	87.0 3.1
72-82	114.30 4.500	130.18 5.125	7.94 0.3125	1563 3447	909 2003	1111 2450	1030 2271	137.4 4.8
72-84	114.30 4.500	133.35 5.250	9.53 0.375	1907 4203	1196 2636	1391 3068	1346 2967	200.9 7.1
72-88	114.30 4.500	139.70 5.500	12.70 0.500	2447 5395	1767 3895	1856 4092	1994 4397	364.7 12.9
76-84	120.65 4.750	133.35 5.250	9.53 0.250	1336 2946	676 1490	915 2017	765 1686	91.5 3.2
76-86	120.65 4.750	136.53 5.375	7.94 0.3125	1654 3647	928 2046	1173 2587	1052 2320	144.6 5.1
76-88	120.65 4.750	139.70 5.500	9.53 0.375	1974 4351	1204 2654	1437 3168	1355 2987	210.7 7.4
76-92	120.65 4.750	146.05 5.750	12.70 0.500	2670 5886	1842 4061	2018 4449	2080 4585	384.6 13.6
76-100	120.65 4.750	158.75 6.250	19.05 0.750	3918 8637	3252 7170	3117 6872	3665 8081	903.7 31.9
80-88	127.00 5.000	139.70 5.500	6.35 0.250	1424 3140	694 1530	974 2146	786 1732	96.2 3.4
80-90	127.00 5.000	142.88 5.625	7.94 0.3125	1745 3848	947 2087	1236 2724	1074 2367	151.8 5.4
80-92	127.00 5.000	146.05 5.750	9.53 0.375	2103 4635	1236 2725	1527 3367	1392 3068	221.4 7.8
80-96	127.00 5.000	152.40 6.000	12.70 0.500	2786 6142	1866 4113	2100 4629	2107 4646	402.5 14.2
80-104	127.00 5.000	165.10 6.500	19.05 0.750	4168 9189	3338 7359	3302 7280	3763 8297	946.2 33.4
88-96	139.70 5.500	152.40 6.000	6.35 0.250	1571 3465	720 1587	1071 2362	815 1796	105.4 3.7
88-98	139.70 5.500	155.58 6.125	7.94 0.3125	1927 4249	982 2165	1360 2998	1114 2457	166.2 5.9
88-100	139.70 5.500	158.75 6.250	9.53 0.375	2299 5068	1274 2808	1663 3665	1435 3163	241.8 8.5
88-104	139.70 5.500	165.10 6.500	12.70 0.500	3018 6654	1911 4214	2263 4988	2160 4761	438.4 15.5
88-112	139.70 5.500	177.80 7.000	19.05 0.750	4436 9780	3382 7457	3489 7692	3815 8411	1024.5 36.1
96-104	152.40 6.000	165.10 6.500	6.35 0.250	1690 3726	736 1622	1150 2534	833 1837	114.3 4.0
96-106	152.40 6.000	168.28 6.625	7.94 0.3125	2109 4650	1016 2239	1484 3271	1153 2541	180.6 6.4
96-108	152.40 6.000	171.45 6.750	9.53 0.375	2495 5499	1310 2888	1798 3964	1476 3253	262.3 9.3
96-112	152.40 6.000	177.80 7.000	12.70 0.500	3358 7403	1999 4406	2506 5526	2259 4980	476.2 16.8
96-120	152.40 6.000	190.50 7.500	19.05 0.750	4938 10886	3539 7802	3859 8508	3993 8804	1109.7 39.1
104-112	165.10 6.500	177.80 7.000	6.35 0.250	1838 4051	759 1674	1247 2750	860 1895	123.6 4.4
104-114	165.10 6.500	180.98 7.125	7.94 0.3125	2291 5052	1047 2309	1608 3545	1188 2620	195.0 6.9
104-116	165.10 6.500	184.15 7.250	9.53 0.375	2690 5931	1344 2963	1934 4263	1515 3339	282.7 10.0

Chassis	B Bore mm/in.	D O.D. mm/in.	W <sub>0</sub> Width mm/in.	Load Ratings				Approx. Weight g/oz.
				Radial		Thrust		
				Static kg/lbs.	Dyn. kg/lbs.	Static kg/lbs.	Dyn. kg/lbs.	
104-120	165.10 6.500	190.50 7.500	12.70 0.500	3590 7915	2039 4495	2669 5885	2305 5082	512.1 18.1
104-128	165.10 6.500	203.20 8.000	19.05 0.750	5441 11995	3685 8125	4229 9324	4160 9172	1194.9 42.1
112-120	177.80 7.000	190.50 7.500	6.35 0.250	1985 4376	781 1722	1345 2965	885 1951	132.8 4.7
112-122	177.80 7.000	193.68 7.625	7.94 0.3125	2429 5356	1065 2347	1701 3750	1208 2664	208.9 7.4
112-124	177.80 7.000	196.85 7.750	9.53 0.375	2949 6501	1397 3080	2114 4661	1574 3470	304.0 10.7
112-128	177.80 7.000	203.20 8.000	12.70 0.500	3822 8425	2078 4581	2782 6244	2350 5181	547.9 19.3
112-136	177.80 7.000	215.90 8.500	19.05 0.750	5707 12582	3720 8202	4416 9735	4201 9261	1273.2 44.9
120-128	190.50 7.500	203.20 8.000	6.35 0.250	2132 4701	802 1769	1443 3181	909 2004	142.0 5.0
120-130	190.50 7.500	206.38 8.125	7.94 0.3125	2611 5757	1094 2411	1825 4024	1241 2737	223.3 7.9
120-132	190.50 7.500	209.55 8.250	9.53 0.375	3145 6933	1428 3147	2250 4960	1609 3547	324.5 11.4
120-136	190.50 7.500	215.90 8.500	12.70 0.500	4162 9177	2154 4748	3076 6782	2436 5371	585.8 20.7
120-144	190.50 7.500	228.60 9.000	19.05 0.750	6211 13694	3854 8498	4786 10552	4354 9598	1358.3 47.9
128-136	203.20 8.000	215.90 8.500	6.35 0.250	2251 4962	816 1798	1521 3353	924 2037	151.0 5.3
128-138	203.20 8.000	219.08 8.625	7.94 0.3125	2794 6159	1122 2473	1949 4298	1273 2807	237.7 8.4
128-140	203.20 8.000	222.25 8.750	9.53 0.375	3341 7365	1457 3213	2385 5259	1642 3621	344.9 12.2
128-144	203.20 8.000	228.60 9.000	12.70 0.500	4394 9687	2189 4826	3239 7141	2477 5460	621.6 21.9
128-152	203.20 8.000	241.30 9.500	19.05 0.750	6476 14278	3886 8568	4972 10962	4390 9679	1436.6 50.7
144-152	228.60 9.000	241.30 9.500	6.35 0.250	2546 5612	854 1883	1716 3784	968 2133	169.4 6.0
144-154	228.60 9.000	244.48 9.625	7.94 0.3125	3158 6962	1174 2589	2198 4845	1333 2939	266.5 9.4
144-156	228.60 9.000	247.65 9.750	9.53 0.375	3733 8229	1513 3337	2656 5857	1706 3762	385.8 13.6
144-160	228.60 9.000	254.00 10.000	12.70 0.500	4967 10949	2291 5051	3646 8038	2593 5716	695.3 24.5
144-168	228.60 9.000	266.70 10.500	19.05 0.750	7487 16506	4129 9104	5713 12596	4667 10289	1607.0 56.7
160-168	254.00 10.000	266.70 10.500	6.35 0.250	2841 6263	890 1962	1912 4215	1008 2223	187.8 6.6
160-170	254.00 10.000	269.88 10.625	7.94 0.3125	3478 7667	1212 2673	2415 5324	1377 3036	294.8 10.4
160-172	254.00 10.000	273.05 10.750	9.53 0.375	4188 9232	1582 3488	2973 6553	1784 3934	427.5 15.1
160-176	254.00 10.000	279.40 11.000	12.70 0.500	5540 12213	2386 5260	4053 8934	2700 5953	768.9 27.1
160-184	254.00 10.000	292.10 11.500	19.05 0.750	8257 18203	4268 9409	6270 13823	4825 10638	1770.5 62.5
176-184	279.40 11.000	292.10 11.500	6.35 0.250	3107 6849	918 2023	2088 4603	1040 2292	206.0 7.3
176-186	279.40 11.000	295.28 11.625	7.94 0.3125	3842 8470	1259 2775	2663 5872	1430 3152	323.6 11.4
176-188	279.40 11.000	298.45 11.750	9.53 0.375	4579 10095	1631 3596	3244 7151	1840 4056	468.4 16.5
176-192	279.40 11.000	304.80 12.000	12.70 0.500	6002 13231	2444 5389	4378 9653	2903 6401	840.6 29.7



The Timken team applies their know-how to improve the reliability and performance of machinery in diverse markets worldwide. The company designs, makes and markets bearings, gear drives, automated lubrication systems, belts, brakes, clutches, chain, couplings, linear motion products and related industrial motion rebuild and repair services.

Stronger. By Design.

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