

• Radial and Angular Contact Ball Bearings

7000WN PRODUCT FAMILY

INTRODUCTION

The high performance 7000WN Angular Contact Product Family is specifically designed to support heavy thrust loads at lower operating temperatures at high speeds. Included in the angular contact series are the following design features:

- Refined bore diameter tolerance
- Increased thrust capacity
- Extended load capacity
- Lower operating temperatures
- Better than ABEC 1 bore diameter tolerances
- High operating contact angle
- Improved ball section ratio
- Low shoulder inner and outer rings improve oil flow

A feature of this series is the refined bore diameter tolerance. The closer bore tolerance in the WN product family reduces the broad range of interference and thus prevents the development of undesirable high preload in mounted duplex pairs. As a result, longer bearing life is achieved and high operating temperatures are avoided.

This product family can support heavy thrust loads by combining high shoulders on the thrust side of both rings with a high operating angle. In addition, uniformity of load per ball under combined loads is more favorable with a high contact angle and results in longer bearing life.

Maximum clearance between the one-piece brass or bronze cage and the land diameters of both rings is achieved in the WN construction. Utilizing low shoulder diameters on the non-thrust sides of inner and outer rings promotes efficient oil passage through the bearing resulting in lower operating temperatures and longer bearing life.

The 7000WN Product Family is divided into several designs. Sizes 7207-7218WN and 7304-7318WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage. Sizes 7219-7230WN and 7319-7330WN have a 40 degree contact angle and a one-piece, outer ring-piloted, high-strength machined bronze cage. The 7412WN and 7415WN both have a 40 degree contact angle and a one-piece conical, high-strength machined bronze cage.

The 7000WN Product Family is available as single bearings and duplex sets. A single with the suffix "SU" is flush ground on both faces for universal mounting. Such bearings can be used as singles or duplex mounted back-to-back (DB), face-to-face (DF) or tandem (DT), depending on the functional requirements of the design. The mounting of duplex "SU" bearings will result in a preload range of minimum internal clearance to a solid preload.

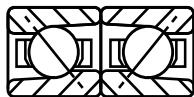
Bearings without the "SU" designation are not flush ground and are intended to be used as singles. These bearings are used to support thrust from one direction and are often accompanied by a preload spring.

Bearings with the suffix "DU" are flush ground on both faces for universal mounting. A duplex pair of "DU" bearings can be mounted (DB, DF, or DT), depending on the functional requirements of the design. These bearings, after mounting, will result in a range of positive light preload.

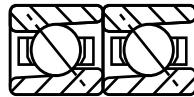
MOUNTING ARRANGEMENTS



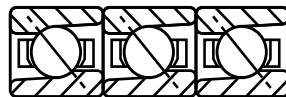
Duplex- DB
Back-to-Back



Duplex- DF
Face-to-Face



Duplex- DT Tandem



Three Bearings in Tandem



Two in Tandem Opposed
with a Single Bearing

APPLICATIONS

These design features are advantageous in applications such as oil refining pump systems where higher productivity and longer system life is important. Other applications where these features are equally suited are deep well pump motors, vertical and horizontal pumps, worm gear and right angle drives, spindles, live centers and gearboxes. For applications requiring a high degree of axial and radial rigidity, these bearings are suggested in preloaded duplex mountings.

MOUNTING

Although each 7000WN Product Family bearing is a self-contained unit, the construction is such that they are frequently mounted as two bearings opposed, so that thrust can be carried in either direction.

Unlike the radial type, the angular contact bearing, when mounted alone, requires adjustment and must be installed with care. As the bearing is relatively loose axially before mounting, it is important that the design incorporate some means to move the outer ring axially into its correct position relative to the inner ring. This adjustment should be made when the bearing is mounted. A common method is to place a preload spring or shims at one bearing location.

The correct adjustment of the single bearing is obtained when the initial axial looseness of the assembly is removed. This eliminates the possibility of premature bearing damage due to excessive preloading or looseness through improper adjustment.

Bearings designated "SU" are ground on both surfaces to permit universal mounting. These duplex sets are ideally suited for applications which involve a combination of radial loads from either direction. "SU" bearings are flush ground so that under a specific axial gage load the inner ring will protrude beyond the face of the outer ring. This design results in an internal axial clearance within the bearing pair that helps to minimize build-up of excessive preload within the bearings when mounted on a shaft with maximum interference.

To assure correct mounting of bearings in the 7000WN Product Family, the word THRUST is marked on the thrust face of both the inner and outer rings. This face should abut against the housing shoulder or the end cover, depending on the required direction of "thrust".

ORDERING INFORMATION

"SU" Suffix: All bearings are packaged singly.

To obtain a pair of SU flush ground bearings for duplex mounting, specify two bearings.

Example: (2) 7210WN SU bearings.

"DU" Suffix: All bearings are packaged as a pair in a single box.

To obtain a pair of DU flush ground bearings for duplex mounting, specify one pair.

Example: one pair-7219WN MBR-DU.

No Suffix: All bearings are packaged singly.

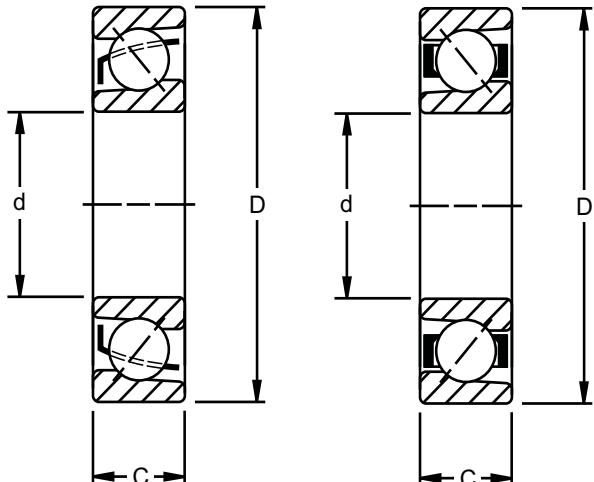
No other designation is required to obtain



BALL BEARINGS

LIGHT 7200WN SERIES

- Dimensionally interchangeable with the radial 200 Series.
- 7000WN Product Family includes a refined bore diameter.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Sizes 7201K through 7203WN have a 20 degree contact angle and a nylon cage.
- Sizes 7204WN through 7218WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage.
- Larger sizes 7219WN through 7230WN have a 40 degree contact angle and a one-piece, outer ring piloted high-strength machined bronze cage.



7207-7218WN
40° Contact Angle

7219-7230WN MBR
40° Contact Angle

DIMENSIONS – TOLERANCES

Bearing Number	Bore d				Outside Diameter D				Width C				Fillet Radius ⁽¹⁾		Wt.		Static Load Rating C ₀		Extended Dynamic Load Rating C _E ⁽⁴⁾	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.	N	lbs.	N	lbs.		
7201K	12	0.4724	0.008	0.0003	32	1.2598	0.011	0.00043	10	0.3937	0.12	0.005	0.6	0.024	0.036	0.08	2790	630	7100	1600
7202W	15	0.5906	0.008	0.0003	35	1.3780	0.011	0.00043	11	0.4331	0.12	0.005	0.6	0.024	0.045	0.10	4700	1060	10300	2320
7203W	17	0.6693	0.008	0.0003	40	1.5748	0.011	0.00043	12	0.4727	0.12	0.005	0.6	0.024	0.068	0.15	6930	1560	14200	3200
7204WN ⁽²⁾⁽³⁾	20	0.7874	0.010	0.0004	47	1.8504	0.011	0.00043	14	0.5512	0.12	0.005	1.0	0.039	0.104	0.23	8100	1830	16800	3800
7205WN ⁽³⁾	25	0.9843	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.132	0.29	9400	2120	16600	3750
7206WN	30	1.1811	0.010	0.0004	62	2.4409	0.013	0.0005	16	0.6299	0.12	0.005	1.0	0.039	0.209	0.46	13500	3050	23000	5200
7207WN	35	1.3780	0.010	0.0004	72	2.8346	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.286	0.63	18000	4150	30800	6950
7208WN	40	1.5748	0.010	0.0004	80	3.1496	0.013	0.0005	18	0.7087	0.12	0.005	1.0	0.039	0.331	0.73	23000	5200	36000	8150
7209WN	45	1.7717	0.010	0.0004	85	3.3465	0.015	0.0006	19	0.7480	0.12	0.005	1.0	0.039	0.435	0.96	25900	5850	40500	9150
7210WN	50	1.9685	0.010	0.0004	90	3.5433	0.015	0.0006	20	0.7874	0.12	0.005	1.0	0.039	0.508	1.12	28400	6400	42500	9500
7211WN	55	2.1654	0.010	0.0004	100	3.9370	0.015	0.0006	21	0.8268	0.15	0.006	1.5	0.059	0.635	1.40	36200	8150	52000	11800
7212WN	60	2.3622	0.010	0.0004	110	4.3307	0.015	0.0006	22	0.8661	0.15	0.006	1.5	0.059	0.835	1.84	44000	10000	63000	14300
7213WN	65	2.5591	0.010	0.0004	120	4.7244	0.015	0.0006	23	0.9055	0.15	0.006	1.5	0.059	1.061	2.34	52400	11800	72400	16300
7214WN	70	2.7559	0.010	0.0004	125	4.9213	0.018	0.0007	24	0.9449	0.15	0.006	1.5	0.059	1.171	2.58	57300	12900	78000	17600
7215WN	75	2.9528	0.010	0.0004	130	5.1181	0.018	0.0007	25	0.9843	0.15	0.006	1.5	0.059	1.271	2.80	58000	13200	78000	17600
7216WN	80	3.1496	0.010	0.0004	140	5.5118	0.018	0.0007	26	1.0236	0.15	0.006	2.0	0.079	1.483	3.27	65500	15600	91500	20400
7217WN	85	3.3465	0.013	0.0005	150	5.9055	0.018	0.0007	28	1.1024	0.20	0.008	2.0	0.079	2.096	4.62	76500	18300	106000	23600
7218WN	90	3.5433	0.013	0.0005	160	6.2992	0.025	0.0010	30	1.1811	0.20	0.008	2.0	0.079	2.567	5.66	88000	21200	119000	27000
7219WN MBR	95	3.7402	0.013	0.0005	170	6.6929	0.025	0.0010	32	1.2600	0.20	0.008	2.0	0.079	3.025	6.67	93000	22800	133000	30000
7220WN MBR	100	3.9370	0.013	0.0005	180	7.0866	0.025	0.0010	34	1.3390	0.20	0.008	2.0	0.079	3.460	7.62	106000	25500	146000	33500
7222WN MBR	110	4.3307	0.013	0.0005	200	7.8740	0.030	0.0012	38	1.4960	0.20	0.008	2.0	0.079	5.162	11.38	134000	32500	173000	39000
7224WN MBR	120	4.7244	0.013	0.0005	215	8.4646	0.030	0.0012	40	1.5750	0.20	0.008	2.0	0.079	6.354	14.01	160000	36500	188000	42500
7226WN MBR	130	5.1181	0.018	0.0007	230	9.0551	0.030	0.0012	40	1.5750	0.25	0.010	2.5	0.098	7.543	16.63	178000	43000	211000	47500
7228WN MBR	140	5.5118	0.018	0.0007	250	9.8425	0.030	0.0012	42	1.6540	0.25	0.010	2.5	0.098	9.634	21.24	200000	47500	224000	50000
7230WN MBR	150	5.9055	0.018	0.0007	270	10.6299	0.035	0.0014	45	1.7720	0.25	0.010	2.5	0.098	11.731	25.84	240000	56000	248000	56000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

(2) Also available as W design.

(3) Also available with 20° contact angle and nylon cage.

(4) Based on 10⁶ revolutions of calculated fatigue life.

Note: 7208WN-7212WN also available with a one-piece, high-strength machined bronze retainer (MBR).

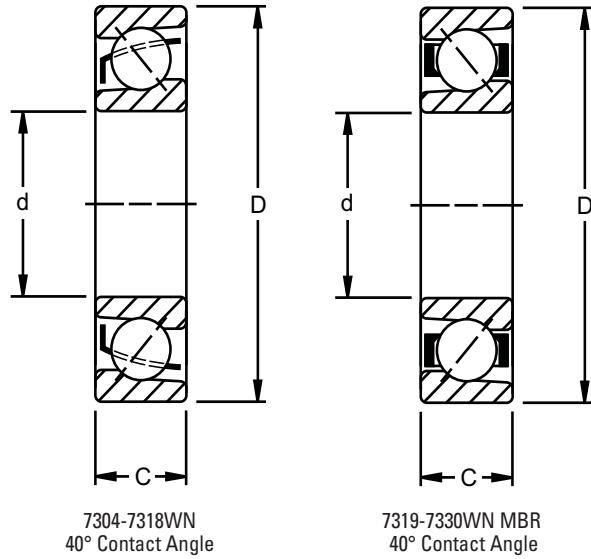
This cage can be quoted on the other sizes by request.

D40 TIMKEN PRODUCTS CATALOG

Radial and Angular Contact Ball Bearings

MEDIUM 7300WN SERIES

- Dimensionally interchangeable with the radial 300 Series.
- The 7000WN Product Family includes a refined bore diameter. The 7300WN Series can sustain heavier thrust and combined loads than the 7200WN Series.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Size 7303W has a 20 degree contact angle and a steel cage.
- Sizes 7304WN through 7318WN have a 40 degree contact angle and a one-piece, ball-piloted, pressed brass cage.
- Larger sizes 7319WN through 7330WN have a 40 degree contact angle and a one-piece, outer ring piloted high-strength machined bronze cage.
- Sizes 7306WN to 7318WN also available with a one-piece, high-strength, machined bronze retainer.



DIMENSIONS – TOLERANCES

Bearing Number	Bore <i>d</i>				Outside Diameter <i>D</i>				Width <i>C</i>				Fillet Radius ⁽¹⁾		Wt.	Static Load Rating <i>C₀</i>	Extended Dynamic Load Rating <i>C_E</i> ⁽²⁾	
	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	kg	lbs.				
7303W	17	0.6693	0.008	0.0003	47	1.8504	0.011	0.00045	14	0.5512	0.12	0.005	1.0	0.039	0.118	0.26	9200 2080	20200 4550
7304WN	20	0.7874	0.010	0.0004	52	2.0472	0.013	0.0005	15	0.5906	0.12	0.005	1.0	0.039	0.150	0.33	9590 2160	19500 4400
7305WN	25	0.9843	0.010	0.0004	62	2.4409	0.013	0.0005	17	0.6693	0.12	0.005	1.0	0.039	0.241	0.53	13300 3000	26500 5850
7306WN	30	1.1811	0.010	0.0004	72	2.8346	0.013	0.0005	19	0.7480	0.12	0.005	1.0	0.039	0.363	0.80	20800 4650	34600 7800
7307WN	35	1.3780	0.010	0.0004	80	3.1496	0.013	0.0005	21	0.8268	0.12	0.005	1.5	0.059	0.408	0.90	23900 5400	41300 9300
7308WN	40	1.5748	0.010	0.0004	90	3.5433	0.015	0.0006	23	0.9055	0.12	0.005	1.5	0.059	0.667	1.47	30200 6800	50600 11400
7309WN	45	1.7717	0.010	0.0004	100	3.9370	0.015	0.0006	25	0.9843	0.12	0.005	1.5	0.059	0.885	1.95	39900 9000	66600 15000
7310WN	50	1.9685	0.010	0.0004	110	4.3307	0.015	0.0006	27	1.0630	0.12	0.005	2.0	0.079	1.139	2.51	47900 10800	76800 17300
7311WN	55	2.1654	0.010	0.0004	120	4.7244	0.015	0.0006	29	1.1417	0.15	0.006	2.0	0.079	1.592	3.51	56400 12700	88800 20000
7312WN	60	2.3622	0.010	0.0004	130	5.1181	0.018	0.0007	31	1.2205	0.15	0.006	2.0	0.079	1.969	4.34	64800 14600	101000 22800
7313WN	65	2.5591	0.010	0.0004	140	5.5118	0.018	0.0007	33	1.2992	0.15	0.006	2.0	0.079	2.477	5.46	75500 17000	115000 26000
7314WN	70	2.7559	0.010	0.0004	150	5.9055	0.018	0.0007	35	1.3780	0.15	0.006	2.0	0.079	2.676	5.90	85700 19300	128000 29000
7315WN	75	2.9528	0.010	0.0004	160	6.2992	0.025	0.0010	37	1.4567	0.15	0.006	2.0	0.079	3.452	7.61	98000 22000	142000 32000
7316WN	80	3.1496	0.010	0.0004	170	6.6929	0.025	0.0010	39	1.5354	0.15	0.006	2.0	0.079	4.504	9.92	108000 24500	153000 34500
7317WN	85	3.3465	0.013	0.0005	180	7.0866	0.025	0.0010	41	1.6124	0.20	0.008	2.5	0.098	4.940	10.88	122000 27500	166000 37500
7318WN	90	3.5433	0.013	0.0005	190	7.4803	0.030	0.0012	43	1.6929	0.20	0.008	2.5	0.098	6.247	13.76	135000 30500	177000 40000
7319WN MBR	95	3.7402	0.013	0.0005	200	7.8740	0.030	0.0012	45	1.7717	0.20	0.008	2.5	0.098	6.706	14.77	148000 33500	191000 43000
7320WN MBR	100	3.9370	0.013	0.0005	215	8.4646	0.030	0.0012	47	1.8504	0.20	0.008	2.5	0.098	8.227	18.12	177000 40000	217000 49000
7321WN MBR	105	4.1339	0.013	0.0005	225	8.8583	0.030	0.0012	49	1.9291	0.20	0.008	2.5	0.098	9.498	20.92	191000 43000	226000 51000
7322WN MBR	110	4.3307	0.013	0.0005	240	9.4488	0.030	0.0012	50	1.9685	0.20	0.008	2.5	0.098	10.892	23.99	226000 51000	253000 57000
7324WN MBR	120	4.7244	0.013	0.0005	260	10.2362	0.035	0.0014	55	2.1654	0.20	0.008	2.5	0.098	14.356	31.62	259000 58500	284000 64000
7326WN MBR	130	5.1181	0.018	0.0007	280	11.0236	0.035	0.0014	58	2.2835	0.25	0.010	3.0	0.118	17.339	38.19	302000 68000	315000 71000
7328WN MBR	140	5.5118	0.018	0.0007	300	11.8110	0.035	0.0014	62	2.4409	0.25	0.010	3.0	0.118	20.294	44.70	346000 78000	339000 76500
7330WN MBR	150	5.9055	0.018	0.0007	320	12.5984	0.040	0.0016	65	2.5591	0.25	0.010	3.0	0.118	24.907	54.86	390000 88000	368000 83000

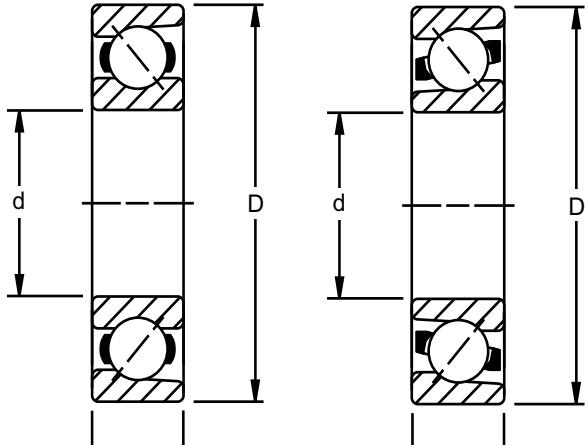
⁽¹⁾ Maximum shaft or housing fillet radius that bearing corners will clear.⁽²⁾ Based on 10⁶ revolutions of calculated fatigue life.



BALL BEARINGS

HEAVY 7400 SERIES

- Dimensionally interchangeable with the radial 400 Series.
- Sizes with a "WN" suffix include a refined bore diameter tolerance.
- Can sustain heavier thrust and combined loads than the 7300WN Series.
- A single bearing is suggested for applications in which the thrust load is in one direction or, in the case of combined loads, the thrust load is high in relation to the radial load.
- A duplex pair is suggested for applications where thrust is present in both directions or where axial displacement of the shaft must be restricted.
- For exceptionally high thrust loads in one direction, a tandem pair can be used, opposed by a third bearing.
- Sizes with a suffix "W" have a 20 degree contact angle and a steel retainer.
- Sizes with a suffix "PW" have a 35 degree contact angle and a steel retainer.
- Sizes with a "WN" suffix have a 40 degree contact angle and a one-piece, high-strength machined bronze cage.



7405W-7409W
20° Contact Angle

7410PW-7420PW
35° Contact Angle

7412WN and 7415WN MBR
40° Contact Angle

D

DIMENSIONS – TOLERANCES

Bearing Number	Bore d				Outside Diameter D				Width C				Fillet Radius ⁽¹⁾		Wt.		Static Load Rating Co		Extended Dynamic Load Rating Cf ⁽²⁾	
	tolerance +0.000 mm +0.0000" to minus		mm	in.	tolerance +0.000 mm +0.0000" to minus		mm	in.	tolerance +0.000 mm +0.0000" to minus		mm	in.	kg	lbs.	N	lbs.	N	lbs.		
7405W	25	0.9843	0.010	0.0004	80	3.1496	0.013	0.0005	21	0.8268	0.12	0.005	1.5	0.060	0.925	2.04	25900	5850	53300	12000
7406W	30	1.1811	0.010	0.0004	90	3.5433	0.015	0.0006	23	0.9055	0.12	0.005	1.5	0.060	0.957	2.11	35500	8000	69000	15600
7407W	35	1.3780	0.012	0.00045	100	3.9370	0.015	0.0006	25	0.9843	0.12	0.005	1.5	0.060	1.002	2.21	42800	9650	79900	18000
7408W	40	1.5748	0.012	0.00045	110	4.3307	0.015	0.0006	27	1.0630	0.12	0.005	2.0	0.080	1.311	2.89	56400	12700	99500	22400
7409W	45	1.7717	0.012	0.00045	120	4.7244	0.015	0.0006	29	1.1417	0.12	0.005	2.0	0.080	1.647	3.63	62000	14000	106000	24000
7410WN	50	1.9685	0.012	0.00045	130	5.1181	0.018	0.0007	31	1.2205	0.12	0.005	2.0	0.080	2.195	4.84	66600	15000	115000	26000
7411PW	55	2.1654	0.015	0.0006	140	5.5118	0.018	0.0007	33	1.2992	0.15	0.006	2.0	0.080	2.681	5.91	71000	16000	122000	27500
7412WN	60	2.3622	0.010	0.0004	150	5.9055	0.018	0.0007	35	1.3780	0.15	0.006	2.0	0.080	3.257	7.18	85700	19300	135000	30500
7413WN	65	2.5591	0.015	0.0006	160	6.2992	0.025	0.0010	37	1.4567	0.15	0.006	2.0	0.080	3.896	8.59	91500	20400	142000	32000
7414WN	70	2.7559	0.015	0.0006	180	7.0866	0.025	0.0010	42	1.6535	0.15	0.006	2.5	0.100	5.688	12.54	115500	26000	173000	39000
7415WN	75	2.9528	0.010	0.0004	190	7.4803	0.030	0.0012	45	1.7717	0.15	0.006	2.5	0.100	6.745	14.87	148000	33500	202000	45500
7416WN	80	3.1496	0.015	0.0006	200	7.8740	0.030	0.0012	48	1.8898	0.15	0.006	2.5	0.100	7.747	17.08	153000	34500	206000	46500
7418PW	90	3.5433	0.020	0.0008	225	8.8583	0.030	0.0012	54	2.1268	0.20	0.008	3.0	0.120	11.159	24.60	200000	45000	236000	53000
7420PW	100	3.9370	0.020	0.0008	265	10.4331	0.036	0.0014	60	2.3622	0.20	0.008	3.0	0.120	18.643	41.10	279000	63000	315000	71000

(1) Maximum shaft or housing fillet radius that bearing corners will clear.

(2) Based on 10⁶ revolutions of calculated fatigue life.

D42 TIMKEN PRODUCTS CATALOG