

Tapered Roller Bearing Tolerance Tables

Tolerances for Inch System Bearings Class 4 and Class 2

Bearing Types	Bore Diameter Tolerance				Cone Width Tolerance				Cone Stand Tolerance				Cup Stand Tolerance				
	TS TSF	TNA TNASW*	TDI TDO		TS TSF				TS	TNA TNASW	TDI TDO		TS TSF ▲	TDI			
Bore Diameter	Class 4		Class 2		Class 4		Class 2		Class 4		Class 2		Class 4		Class 2		
Inch/mm	.0001 Inch/Micrometers																
Over	Incl	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
0.0 0.0	3.0000 76.200	+5 +13	0 0	+5 +13	0 0	+30 +76	-100 -254	+30 +76	-100 -254	+40 +102	0 0	+40 +102	0 0	+40 +102	0 0	+40 +102	0 0
3.0000 76.200	4.0000 101.600	+10 +25	0 0	+10 +25	0 0	+30 +76	-100 -254	+30 +76	-100 -254	+40 +102	0 0	+40 +102	0 0	+40 +102	0 0	+40 +102	0 0
4.0000 101.600	12.0000 304.800	+10 +25	0 0	+10 +25	0 0	+30 +76	-100 -254	+30 +76	-100 -254	+60 +152	-60 -152	+40 +102	0 0	+80 +203	-40 -102	+40 +102	0 0
12.0000 304.800	16.0000 406.400	— —	— —	+20 +51	0 0	+30 +76	-100 -254	+30 +76	-100 -254	— —	— —	+70 +178	-70 -178	— —	— —	+80 +203	-80 -203

* For TNASW type bearings, see tolerance tables located on page 211.

▲ For TSF type bearings, the cup stand is measured from the backface of the flange.

Tolerances for Inch System Bearings Class 4 and Class 2

Bearing Types	Outside Diameter Tolerance				Cone Width Tolerance				Cup Flange Diameter Tolerance				Assembled Bearing Radial Runout			
	TS TSF	TNA TNASW	TDI TDO		TS TSF				TSF				TS TSF	TNA TNASW	TDI TDO	
Outside Diameter	Class 4		Class 2		Class 4		Class 2		Class 4		Class 2		Class 4		Class 2	
Inch/mm	.0001 Inch/Micrometers															
Over	Incl	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	Maximum	Maximum	
0.0 0.0	12.0000 304.800	+10 +25	0 0	+10 +25	0 0	+20 +51	-100 -254	+20 +51	-100 -254	+20 +51	0 0	+20 +51	0 0	20 51	15 38	
12.0000 304.800	24.0000 609.600	+20 +51	0 0	+20 +51	0 0	+20 +51	-100 -254	+20 +51	-100 -254	+30 +76	0 0	+30 +76	0 0	20 51	15 38	

Tolerances for Inch System Bearings Class 4 and Class 2

Bearing Types	Overall Bearing Width Tolerance												
	TS TSF ■	TNA TNASW				TDI TDO							
Bore Diameter	Class 4		Class 2		Class 4		Class 2		Class 4		Class 2		
Inch/mm	.0001 Inch/Micrometers												
Over	Incl	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
0.0 0.0	4.0000 101.600	+80 +203	0 0	+80 +203	0 0	— —	— —	+100 +254	0 0	+160 +406	0 0	+160 +406	0 0
4.0000 101.600	5.0000 127.000	+140 +356	-100 -254	+80 +203	0 0	— —	— —	+100 +254	0 0	+280 +711	-200 -508	+160 +406	-80 -203
5.0000 127.000	12.0000 304.800	+140 +356	-100 -254	+80 +203	0 0	— —	— —	+300 +762	0 0	+280 +711	-200 -508	+160 +406	-80 -203
12.0000 304.800	16.0000 406.400	— —	— —	+150 +381	-150 -381	— —	— —	— —	— —	— —	— —	+300 +762	-300 -762

■ For TSF type bearings, the tolerance is applied to the dimension from the backface of the flange to the backface of the cone.

Tolerances for Metric System Bearings Class K and Class N (For “J” Prefix Bearings)

Bearing Types		Bore Diameter Tolerance				Cone Width Tolerance				Cone Stand Tolerance				Cup Stand Tolerance				Overall Brg Width Tolerance			
		TS TSF		TS TSF		TS TSF		TS TSF		TS TSF ▲		TS TSF ■									
Bore Diameter		Class K		Class N		Class K		Class N		Class K		Class N		Class K		Class N		Class K		Class N	
Inch/mm		.0001 Inch/Micrometers																			
Over	Inclusive	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low
0.7087 18.000	1.9685 50.000	0 0	-5 -12	0 0	-5 -12	0 0	-39 -100	0 0	-20 -50	+39 +100	0 0	+20 +50	0 0	+39 +100	0 0	+20 +50	0 0	+79 +200	0 0	+39 +100	0 0
1.9685 50.000	3.1496 80.000	0 0	-6 -15	0 0	-6 -15	0 0	-59 -150	0 0	-20 -50	+39 +100	0 0	+20 +50	0 0	+39 +100	0 0	+20 +50	0 0	+79 +200	0 0	+39 +100	0 0
3.1496 80.000	4.7244 120.000	0 0	-8 -20	0 0	-8 -20	0 0	-59 -150	0 0	-20 -50	+39 +100	-39 -100	+20 +50	0 0	+39 +100	-39 -100	+20 +50	0 0	+79 +200	-79 -200	+39 +100	0 0
4.7244 120.000	7.0866 180.000	0 0	-10 -25	0 0	-10 -25	0 0	-79 -200	0 0	-20 -50	+59 +150	-59 -150	+20 +50	0 0	+79 +200	-39 -100	+39 +100	0 0	+138 +350	-98 -250	+59 +150	0 0
7.0866 180.000	9.8425 250.000	0 0	-12 -30	0 0	-12 -30	0 0	-79 -200	0 0	-20 -50	+59 +150	-59 -150	+20 +50	0 0	+79 +200	-39 -100	+39 +100	0 0	+138 +350	-98 -250	+59 +150	0 0

▲ For TSF type bearings, the cup stand is measured from the backface of the flange.

■ For TSF type bearings, the tolerance is applied to the dimension from the backface of the flange to the backface of the cone.

Tolerances for Metric System Bearings Class K and Class N (For “J” Prefix Bearings)

Bearing Types		Outside Diameter Tolerance				Cup Width Tolerance				Cup Flange Diameter Tolerance				Assembled Bearing Radial Runout			
		TS TSF		TS TSF		TS TSF		TSF		TSF		TS TSF					
Outside Diameter		Class K		Class N		Class K		Class N		Class K		Class N		Class K		Class N	
Inch/mm		.0001 Inch/Micrometers															
Over	Incl	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	High	Low	Maximum	Maximum
3.1496 80	4.7244 120	0 0	-7 -18	0 0	-7 -18	0 0	-79 -200	0 0	-39 -100	0 0	-18 -45	0 0	18 45	0 0	18 45	14 35	14 35
4.7244 120	5.9055 150	0 0	-8 -20	0 0	-8 -20	0 0	-79 -200	0 0	-39 -100	0 0	-20 -50	0 0	20 50	0 0	20 50	16 40	16 40
5.9055 150	7.0866 180	0 0	-10 -25	0 0	-10 -25	0 0	-79 -200	0 0	-39 -100	0 0	-20 -50	0 0	20 50	0 0	20 50	18 45	18 45
7.0866 180	9.8425 250	0 0	-12 -30	0 0	-12 -30	0 0	-98 -250	0 0	-39 -100	0 0	-22 -55	0 0	22 55	0 0	22 55	20 50	20 50
9.8425 250	12.4016 315	0 0	-14 -35	0 0	-14 -35	0 0	-98 -250	0 0	-39 -100	0 0	-26 -65	0 0	26 65	0 0	26 65	24 60	24 60

Tapered Roller Bearings

Tapered Roller Bearing Fitting Practice Tables

The fitting practice data given in the following tables conforms to industry and AFBMA/ANSI standards. These tables apply to solid or heavy-sectioned steel shafts, heavy-sectioned ferrous housings and normal operating conditions. Certain fitting practice data given in these tables may not be adequate for applications involving very heavy loads, very high speeds, unusual thermal conditions, light shafts and housing sections. In certain cases the method of assembly and the means and ease of obtaining the bearing setting may require

fits different from those given in the tables.

Fitting practice for nonadjustable TNA and TNASW two row bearings are shown on pages 201 to 211. Shaft and housing material, geometry, hardness and surface finish must be carefully controlled. Ground shafts should be finished to 50 micro-inches AA or better, for turned shafts a finish of 100 micro-inches AA or better, and housing bores should be finished to 160 micro-inches AA or better.

Cone Fitting Practice for Inch System Bearings Class 4 and Class 2

Bore Diameter			Rotating Cone		Rotating or Stationary Cone		Stationary Cone							
			Ground Shaft		Ground Shaft or Unground Shaft		Unground Shaft		Ground Shaft		Unground Shaft		Hardened and Ground Shaft	
			Steady Load with Moderate Shock		Heavy Loads, High Speed, or Shock		Moderate Loads, No Shock		Moderate Loads, No Shock		Sheaves, Wheels, Idlers		Wheel Spindles	
Inch/mm			.0001 Inch/Micrometers											
Over	Incl	Tolerance	Shaft Diameter	Resultant Fit	Shaft Diameter	Resultant Fit	Shaft Diameter	Resultant Fit	Shaft Diameter	Resultant Fit	Shaft Diameter	Resultant Fit	Shaft Diameter	Resultant Fit
0.0	3.0000	+ 5 0	+ 10 + 15	5T 15T	+ 15 + 25	10T 25T	0 + 5	5L 5T	- 5 0	10L 0	- 5 0	10L 0	- 7 - 2	12L 2L
0.0	76.200	+ 13 0	+ 25 + 38	12T 38T	+ 38 + 64	25T 64T	0 + 13	13L 13T	- 13 0	26L 0	- 13 0	26L 0	- 18 - 5	31L 5L
3.0000	12.0000	+ 10 0	+ 15 + 25	5T 25T	See Note		0 + 10	10L 10T	- 10 0	20L 0	- 10 0	20L 0	- 12 - 2	22L 2L
76.200	304.800	+ 25 0	+ 38 + 64	13T 64T			0 + 25	25L 25T	- 25 0	50L 0	- 25 0	50L 0	- 30 - 5	55L 5L
12.0000	16.0000	+ 20 0	+ 30 + 50	10T 50T	See Note		0 + 20	20L 20T	- 20 0	40L 0	- 20 0	40L 0	— —	— —
304.800	406.400	+ 51 0	+ 76 + 127	25T 127T			0 + 51	51L 51T	- 51 0	102L 0	- 51 0	102L 0	— —	— —

NOTE: It is recommended that all shafts be ground. In those cases where this is not possible, a minimum shaft diameter should be provided equal to the Bore Diameter plus .0005 In/In (.012 mm/mm) of Bore Diameter. Add this value to the Bore Diameter tolerance.

Cup Fitting Practice for Inch System Bearings Class 4 and Class 2

Outside Diameter			Stationary Cup				Stationary or Rotating Cone		Stationary Cup	
			Clamped or Floating		Adjustable		Nonadjustable or Sheaves—Clamped		Sheaves—Unclamped	
Inch/mm			.0001 Inch/Micrometers							
Over	Incl	Tolerance	Housing Diameter	Resultant Fit	Housing Diameter	Resultant Fit	Housing Diameter	Resultant Fit	Housing Diameter	Resultant Fit
0.0	3.0000	+ 10 0	+ 20 + 30	10L 30I	0 + 10	10T 10I	- 15 - 5	25T 5t	- 30 - 20	40T 20t
0.0	76.200	+ 25 0	+ 51 + 76	26L 76L	0 + 25	25T 25L	- 38 - 13	63T 13T	- 76 + 51	101T 51T
3.0000	5.0000	+ 10 0	+ 20 + 30	10L 30L	0 + 10	10T 10T	- 20 - 10	30T 10T	- 30 - 20	40T 20T
76.200	127.000	+ 25 0	+ 51 + 76	26L 76L	0 + 25	25T 25L	- 51 - 25	76T 25T	- 76 - 51	101T 51T
5.0000	12.0000	+ 10 0	+ 20 + 30	10L 30L	0 + 20	10T 20L	- 20 - 10	30T 10T	- 30 - 20	40T 20T
127.000	304.800	+ 25 0	+ 51 + 76	26L 76L	0 + 51	25T 51L	- 51 - 25	76T 25T	- 76 - 51	101T 51T
12.0000	24.0000	+ 20 0	+ 40 + 60	20L 60L	+ 10 + 30	10T 30L	- 30 - 10	50T 10T	- 40 - 20	60T 20T
304.800	609.600	+ 51 0	+ 102 + 152	51L 152L	+ 26 + 76	25T 76L	- 76 - 25	127T 25T	- 102 - 51	153T 51T

**Cone Fitting Practice for Metric System Bearings Class K and Class N
(For “J” Prefix Bearing)**

Bore Diameter			Rotating Cone			Rotating or Stationary Cone			Stationary Cone											
			Ground Shaft			Ground Shaft or Unground Shaft			Unground Shaft			Ground Shaft			Unground Shaft			Hardened and Ground Shaft		
			Steady Load with Moderate Shock			Heavy Loads, High Speed, or Shock			Moderate Loads, No Shock			Moderate Loads, No Shock			Sheaves, Wheels, Idlers			Wheel Spindles		
Inch/mm			.0001 Inch/Micrometers																	
Over	Incl	Tolerance	Shaft Diameter	Resultant Fit	Symbol	Shaft Diameter	Resultant Fit	Symbol	Shaft Diameter	Resultant Fit	Symbol	Shaft Diameter	Resultant Fit	Symbol	Shaft Diameter	Resultant Fit	Symbol	Shaft Diameter	Resultant Fit	Symbol
1.1811	1.9685	0 -5 -12	+4 +10 +9 +25	4T 15T 9T 37T	m6	+7 +13 +17 +33	7T 18T 17T 45T	n6	-6 0 -16 0	6L 5T 16L 12T	h6	-10 -4 -25 -9	10L 1T 25L 3T	g6	-10 -4 -25 -9	10L 1T 25L 3T	g6	-16 -10 -41 -25	16L 5L 41L 13L	f6
1.9685	3.1496	0 -6 0 -15	+5 +12 +11 +30	5T 18T 11T 45T	m6	+8 +15 +20 +39	8T 21T 20T 54T	n6	-7 0 -19 0	7L 6T 19L 15T	h6	-11 -4 -29 -10	11L 2T 29L 5T	g6	-11 -4 -29 -10	11L 2T 29L 5T	g6	-19 -12 -49 -30	19L 6L 49L 15L	f6
3.1496	4.7244	0 -8 0 -20	+5 +14 +13 +35	5T 22T 13T 55T	m6	+10 +19 +23 +45	10T 27T 23T 65T	n6	-9 0 -22 0	9L 8T 22L 20T	h6	-14 -5 -34 -12	14L 3T 34L 8T	g6	-14 -5 -34 -12	14L 3T 34L 8T	g6	-23 -14 -58 -36	23L 6L 58L 16L	f6
4.7244	7.0866	0 -10 0 -25	+12 +22 +27 +52	12T 32T 27T 77T	n6	+18 +28 +43 +68	18T 38T 43T 93T	p6	-10 0 -25 0	10L 10T 25L 25T	h6	-16 -6 -39 -14	16L 4T 39L 11T	g6	-16 -6 -39 -14	16L 4T 39L 11T	g6	-26 -16 -68 -43	26L 6L 68L 18L	f6
7.0866	9.8425	0 -12 0 -30	+14 +26 +31 +60	14T 38T 31T 90T	n6	+30 +42 +80 +109	30T 54T 80T 139T	r6	-12 0 -29 0	12L 12T 29L 30T	h6	-18 -6 -44 -15	18L 6T 44L 15T	g6	-18 -6 -44 -15	18L 6T 44T 15T	g6	-32 -20 -79 -50	32L 8L 79L 20L	f6

Cup Fitting Practice for Inch System Bearings Class 4 and Class 2

Outside Diameter			Stationary Cup									Rotating Cup					
			Clamped or Floating			Adjustable			Nonadjustable			Nonadjustable or Sheaves—Clamped			Sheaves—Unclamped		
			Inch/mm			.0001 Inch/Micrometers											
Over	Incl	Tolerance	Housing Diameter	Resultant Fit	Symbol	Housing Diameter	Resultant Fit	Symbol	Housing Diameter	Resultant Fit	Symbol	Housing Diameter	Resultant Fit	Symbol	Housing Diameter	Resultant Fit	Symbol
3.1496	4.7244	0 -7 -18	+5 +19 +12 +47	5L 26L 12L 65L	G7	-5 +9 -13 +22	5T 16L 13T 40L	J7	-25 -11 -59 -24	25T 4T 59T 6T	P7	-30 -16 -76 -41	30T 9T 76T 23T	R7	-40 -20 100 -50	40T 13T 100T 32T	—
4.7244	5.9055	0 -8 0 -20	+6 +22 +14 +54	6L 30L 14L 74L	G7	-6 +10 -14 +26	6T 18L 14T 46L	J7	-28 -12 -68 -28	28T 4T 68T 8T	P7	-35 -20 -90 -50	35T 12T 90T 30T	R7	-45 -25 -115 -65	45T 17T 115T 45T	—
5.9055	7.0866	0 -10 0 -25	+6 +22 +14 +54	6L 32L 14L 79L	G7	-6 +10 -14 +26	6T 20L 14T 51L	J7	-28 -12 -68 -28	28T 2T 68T 3T	P7	-37 -21 -93 -53	37T 11T 93T 28T	R7	-45 -25 -115 -65	45T 15T 115T 40T	—
7.0866	9.8425	0 -12 0 -30	+6 +24 +15 +61	6L 36L 15L 91L	G7	-7 +11 -16 +30	7T 23L 16T 60L	J7	-32 -14 -79 -33	32T 2T 79T 3T	P7	-43 -25 -109 -63	43T 13T 109T 33T	R7	-50 -30 -125 -75	50T 18T 125T 45T	—
9.8425	12.4016	0 -14 0 -35	+7 +27 +17 +69	7L 41L 17L 104L	G7	-7 +13 -16 +36	7T 27L 16T 71L	J7	-34 -14 -88 -36	34T 0 88T 1T	P7	-51 -31 -130 -78	51T 17T 130T 43T	R7	-55 -35 -140 -90	55T 21T 140T 55T	—