METRIC SYSTEM

RADIAL BALL, SPHERICAL AND CYLINDRICAL ROLLER BEARINGS

Standard Timken® radial ball, radial spherical roller and radial cylindrical roller bearings maintain normal tolerances according to the current ISO 492 standard. Tables 15 and 16 list the critical tolerances for these bearing types. For applications where running tolerance is critical, P6 or P5 tolerances are recommended.

The term deviation is defined as the difference between a single ring dimension and the nominal dimension. For metric tolerances, the nominal dimension is at a +0 mm (0 in.) tolerance. The deviation is the tolerance range for the listed parameter. Variation is defined as the difference between the largest and smallest measurements of a given parameter for an individual ring.

TABLE 15. RADIAL BALL, SPHERICAL AND CYLINDRICAL ROLLER BEARING TOLERANCES – INNER RING (Metric)

Bearing Bore		Bore Deviation[1] Δ_{dmp}			Width Variation V_{BS}			Radial Runout K_{ia}			Face Runout with Bore S_d	Axial Runout S_{ia}	Width Deviation Inner & Outer Rings[1] Δ_{Bs} and Δ_{Cs}	
Over	Incl.	P0	P6	P5	P0	P6	P5	P0	P6	P5	P5	P5	P0, P6	P5
mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
2.5000 0.0984	**10.000** 0.3937	**-0.008** -0.0003	**-0.007** -0.0003	**-0.005** -0.0002	**0.015** 0.0006	**0.015** 0.0006	**0.005** 0.0002	**0.010** 0.0004	**0.006** 0.0002	**0.004** 0.0002	**0.007** 0.0003	**0.007** 0.0003	**-0.120** -0.0047	**-0.040** -0.0157
10.000 0.3937	**18.000** 0.7087	**-0.008** -0.0003	**-0.007** -0.0003	**-0.005** -0.0002	**0.020** 0.0008	**0.020** 0.0008	**0.005** 0.0002	**0.010** 0.0004	**0.007** 0.0003	**0.004** 0.0002	**0.007** 0.0003	**0.007** 0.0003	**-0.120** -0.0047	**-0.080** -0.0031
18.000 0.7087	**30.000** 1.1811	**-0.010** -0.0004	**-0.008** -0.0003	**-0.006** -0.0002	**0.020** 0.0008	**0.020** 0.0008	**0.005** 0.0002	**0.013** 0.0005	**0.008** 0.0003	**0.004** 0.0002	**0.008** 0.0003	**0.008** 0.0003	**-0.120** -0.0047	**-0.120** -0.0047
30.000 1.1811	**50.000** 1.9685	**-0.012** -0.0005	**-0.010** -0.0004	**-0.008** -0.0003	**0.020** 0.0008	**0.020** 0.0008	**0.005** 0.0002	**0.015** 0.0006	**0.010** 0.0004	**0.005** 0.0002	**0.008** 0.0003	**0.008** 0.0003	**-0.120** -0.0047	**-0.120** -0.0047
50.000 1.9685	**80.000** 3.1496	**-0.015** -0.0006	**-0.012** -0.0005	**-0.009** -0.0004	**0.025** 0.0010	**0.025** 0.0010	**0.006** 0.0002	**0.020** 0.0008	**0.010** 0.0004	**0.005** 0.0002	**0.008** 0.0003	**0.008** 0.0003	**-0.150** -0.0059	**-0.150** -0.0059
80.000 3.1496	**120.000** 4.7244	**-0.020** -0.0008	**-0.015** -0.0006	**-0.010** -0.0004	**0.025** 0.0010	**0.025** 0.0010	**0.007** 0.0003	**0.025** 0.0010	**0.013** 0.0005	**0.006** 0.0002	**0.009** 0.0004	**0.009** 0.0004	**-0.200** -0.0079	**-0.200** -0.0079
120.000 4.7244	**150.000** 5.9055	**-0.025** -0.0010	**-0.018** -0.0007	**-0.013** -0.0005	**0.030** 0.0012	**0.030** 0.0012	**0.008** 0.0003	**0.030** 0.0012	**0.018** 0.0007	**0.008** 0.0003	**0.010** 0.0004	**0.010** 0.0004	**-0.250** -0.0098	**-0.250** -0.0098
150.000 5.9055	**180.000** 7.0866	**-0.025** -0.0010	**-0.018** -0.0007	**-0.013** -0.0005	**0.030** 0.0012	**0.030** 0.0012	**0.008** 0.0003	**0.030** 0.0012	**0.018** 0.0007	**0.008** 0.0003	**0.010** 0.0004	**0.010** 0.0004	**-0.250** -0.0098	**-0.250** -0.0098
180.000 7.0866	**250.000** 9.8425	**-0.030** -0.0012	**-0.022** -0.0009	**-0.015** -0.0006	**0.030** 0.0012	**0.030** 0.0012	**0.010** 0.0004	**0.040** 0.0016	**0.020** 0.0008	**0.010** 0.0004	**0.011** 0.0004	**0.013** 0.0005	**-0.300** -0.0018	**-0.300** -0.0018
250.000 9.8425	**315.000** 12.4016	**-0.035** -0.0014	**-0.025** -0.0010	**-0.018** -0.0007	**0.035** 0.0014	**0.035** 0.0014	**0.013** 0.0005	**0.050** 0.0020	**0.025** 0.0010	**0.013** 0.0005	**0.013** 0.0005	**0.015** 0.0006	**-0.350** -0.0138	**-0.350** -0.0138
315.000 12.4016	**400.000** 15.7480	**-0.040** -0.0016	**-0.030** -0.0012	**-0.023** -0.0009	**0.040** 0.0016	**0.040** 0.0016	**0.015** 0.0006	**0.060** 0.0024	**0.030** 0.0012	**0.015** 0.0006	**0.015** 0.0006	**0.020** 0.0008	**-0.400** -0.0157	**-0.400** -0.0157
400.000 15.7480	**500.000** 19.6850	**-0.045** -0.0018	**-0.035** -0.0014	– –	**0.050** 0.0020	**0.045** 0.0018	– –	**0.065** 0.0026	**0.035** 0.0014	– –	– –	– –	**-0.450** -0.0177	– –
500.000 19.6850	**630.000** 24.8031	**-0.050** -0.0020	**-0.040** -0.0016	– –	**0.060** 0.0024	**0.050** 0.0020	– –	**0.070** 0.0028	**0.040** 0.0016	– –	– –	– –	**-0.500** -0.0197	– –
630.000 24.8031	**800.000** 31.4961	**-0.075** -0.0030	– –	– –	**0.070** 0.0028	– –	– –	**0.080** 0.0031	– –	– –	– –	– –	**-0.750** -0.0295	– –

[1]Tolerance range is from +0 to value listed.

METRIC SYSTEM

TABLE 16. RADIAL BALL, SPHERICAL AND CYLINDRICAL ROLLER BEARING TOLERANCES – OUTER RING (Metric)

Bearing O.D.		Outside Deviation[1] Δ_{Dmp}			Width Variation V_{CS}		Radial Runout K_{ea}			Axial Runout S_{ea}	Outside Diameter Runout With Face S_D
Over	Incl.	P0	P6	P5	P0	P6	P0	P6	P5	P5	P5
mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
0.000 0.0000	**18.000** 0.7087	**-0.008** -0.0003	**-0.007** -0.0003	**-0.005** -0.0002	**0.015** 0.0006	**0.005** 0.0002	**0.015** 0.0006	**0.008** 0.0003	**0.005** 0.0002	**0.008** 0.0003	**0.008** 0.0003
18.000 0.7087	**30.000** 1.1811	**-0.009** -0.0004	**-0.008** -0.0003	**-0.006** -0.00024	**0.020** 0.0008	**0.005** 0.0002	**0.015** 0.0006	**0.009** 0.0004	**0.006** 0.00024	**0.008** 0.0003	**0.008** 0.0003
30.000 1.1811	**50.000** 1.9685	**-0.011** -0.0004	**-0.009** -0.0004	**-0.007** -0.0003	**0.020** 0.0008	**0.005** 0.0002	**0.020** 0.0008	**0.010** 0.0004	**0.007** 0.0003	**0.008** 0.0003	**0.008** 0.0003
50.000 1.9685	**80.000** 3.1496	**-0.013** -0.0005	**-0.011** -0.0004	**-0.009** -0.0004	**0.025** 0.0010	**0.006** 0.00024	**0.025** 0.0010	**0.013** 0.0005	**0.008** 0.0003	**0.010** 0.0004	**0.008** 0.0003
80.000 3.1496	**120.000** 4.7244	**-0.015** -0.0006	**-0.013** -0.0005	**-0.010** -0.0004	**0.025** 0.0010	**0.008** 0.0003	**0.035** 0.0014	**0.018** 0.0007	**0.010** 0.0004	**0.011** 0.0004	**0.009** 0.0004
120.000 4.7244	**150.000** 5.9055	**-0.018** -0.0007	**-0.015** -0.0006	**-0.011** -0.0004	**0.030** 0.0012	**0.008** 0.0003	**0.040** 0.0016	**0.020** 0.0008	**0.011** 0.0004	**0.013** 0.0005	**0.010** 0.0004
150.000 5.9055	**180.000** 7.0866	**-0.025** -0.0010	**-0.018** -0.0007	**-0.013** -0.0005	**0.030** 0.0012	**0.008** 0.0003	**0.045** 0.0018	**0.023** 0.0009	**0.013** 0.0005	**0.014** 0.0006	**0.010** 0.0004
180.000 7.0866	**250.000** 9.8425	**-0.030** -0.0012	**-0.020** -0.0008	**-0.015** -0.0006	**0.030** 0.0012	**0.010** 0.0004	**0.050** 0.0020	**0.025** 0.0010	**0.015** 0.0006	**0.015** 0.0006	**0.011** 0.0004
250.000 9.8425	**315.000** 12.4016	**-0.035** -0.0014	**-0.025** -0.0010	**-0.018** -0.0007	**0.035** 0.0014	**0.011** 0.0004	**0.060** 0.0024	**0.030** 0.0012	**0.018** 0.0007	**0.018** 0.0007	**0.013** 0.0005
315.000 12.4016	**400.000** 15.7480	**-0.040** -0.0016	**-0.028** -0.0011	**-0.020** -0.0008	**0.040** 0.0016	**0.013** 0.0005	**0.070** 0.0028	**0.035** 0.0014	**0.020** 0.0008	**0.020** 0.0008	**0.013** 0.0005
400.000 15.7480	**500.000** 19.6850	**-0.045** -0.0018	**-0.033** -0.0013	**-0.023** -0.0009	**0.045** 0.0018	**0.015** 0.0006	**0.080** 0.0031	**0.040** 0.0016	**0.023** 0.0009	**0.023** 0.0009	**0.015** 0.0006
500.000 19.6850	**630.000** 24.8031	**-0.050** -0.0020	**-0.038** -0.0015	**-0.028** -0.0011	**0.050** 0.0020	**0.018** 0.0007	**0.100** 0.0039	**0.050** 0.0020	**0.025** 0.0010	**0.025** 0.0010	**0.018** 0.0007
630.000 24.8031	**800.000** 31.4961	**-0.075** -0.0030	**-0.045** -0.0018	**-0.035** -0.0014	– –	**0.020** 0.0008	**0.120** 0.0047	**0.060** 0.0024	**0.030** 0.0012	**0.030** 0.0012	**0.020** 0.0008
800.000 31.4961	**1000.000** 39.3701	**-0.100** -0.0040	**-0.060** -0.0024	– –	– –	– –	**0.140** 0.0055	**0.075** 0.0030	– –	– –	– –
1000.000 39.3701	**1250.000** 49.2126	**-0.125** -0.0050	– –	– –	– –	– –	**0.160** 0.0063	– –	– –	– –	– –

[1]Tolerance range is from +0 to value listed.

TABLE 17. THRUST BALL BEARING TOLERANCES – TYPE TVB

Bore			O.D.			Height			
Bearing Bore		Tolerance[1]	Bearing O.D.		Tolerance[1]	Bearing Bore		Tolerance	
Over	Incl.		Over	Incl.		Over	Incl.	Max.	Min.
mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
0.000 0.0000	**171.450** 6.7500	**+0.127** +0.0050	**0.000** 0.0000	**134.938** 5.3125	**-0.051** -0.0020	**0.000** 0.0000	**46.038** 1.8125	**+0.127** +0.0050	**-0.127** -0.0050
171.450 6.7500	**508.000** 20.0000	**+0.178** +0.0070	**134.938** 5.3125	**441.325** 17.3750	**-0.076** -0.0030	**46.038** 1.8125	**304.800** 12.0000	**+0.254** +0.0100	**-0.254** -0.0100
– –	– –	– –	**441.325** 17.3750	**1000.000** 39.3701	**-0.102** -0.0040	**304.800** 12.0000	**508.000** 20.0000	**+0.381** +0.0150	**-0.381** -0.0150

[1]The tolerances in this table conform to ABMA Standard 21.2.

TABLE 18. THRUST BALL BEARING TOLERANCES – TYPES TVL & DTVL

Bore			O.D.			Height		
Bearing Bore		Tolerance[1]	Bearing O.D.		Tolerance[1]	Bearing Bore		Tolerance
Over	Incl.		Over	Incl.		Over	Incl.	Max.
mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
0.000 0.0000	**504.825** 19.8750	**-0.076** -0.0030	**0.000** 0.0000	**584.000** 23.0000	**-0.076** -0.0030	All Sizes		**±0.381** ±0.0150
504.825 19.8750	**1524.000** 60.0000	**-0.127** -0.0050	**584.000** 23.0000	**1778.000** 70.0000	**-0.127** -0.0050			– –

[1]The tolerances in this table conform to ABMA Standard 21.2.

TABLE 19. THRUST SPHERICAL ROLLER BEARING TOLERANCES

Inner Ring				Outer Ring							
Bore		Tolerance		O.D.		Tolerance		Bore Diameter		Tolerance	
		Bore[1]	Radial Runout			O.D.[1]	Radial Runout			Height	
Over	Incl.			Over	Incl.			Over	Incl.	Max.	Min.
mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
80.000 3.1496	**120.000** 4.7244	**-0.020** -0.0008	**0.025** 0.0010	**120.000** 4.7244	**150.000** 5.9055	**-0.020** -0.0080	**0.041** 0.0016	**80.000** 3.1496	**120.000** 4.7244	**+0.094** +0.0037	**-0.254** -0.0100
120.000 4.7244	**180.000** 7.0866	**-0.025** -0.0010	**0.030** 0.0012	**150.000** 5.9055	**180.000** 7.0866	**-0.025** -0.0010	**0.046** 0.0018	**120.000** 4.7244	**180.000** 7.0866	**+0.109** +0.0043	**-0.300** -0.0118
180.000 7.0866	**250.000** 9.8425	**-0.030** -0.0012	**0.041** 0.0016	**180.000** 7.0866	**250.000** 9.8425	**-0.030** -0.0012	**0.051** 0.0020	**180.000** 7.0866	**250.000** 9.8425	**+0.130** +0.0051	**-0.366** -0.0144
250.000 9.8425	**315.000** 12.4016	**-0.036** -0.0014	**0.051** 0.0020	**250.000** 9.8425	**315.000** 12.4016	**-0.036** -0.0014	**0.061** 0.0024	**250.000** 9.8425	**315.000** 12.4016	**+0.155** +0.0061	**-0.434** -0.0171
315.000 12.4016	**400.000** 15.7480	**-0.041** -0.0016	**0.061** 0.0024	**315.000** 12.4016	**400.000** 15.7480	**-0.041** -0.0016	**0.071** 0.0028	**315.000** 12.4016	**400.000** 15.7480	**+0.170** +0.0067	**-0.480** -0.0189
400.000 15.7480	**500.000** 19.6850	**-0.046** -0.0018	**0.066** 0.0026	**400.000** 15.7480	**500.000** 19.6850	**-0.046** -0.0018	**0.081** 0.0032	**400.000** 15.7480	**500.000** 19.6850	**+0.185** +0.0073	**-0.526** -0.0207
500.000 19.6850	**630.000** 24.8031	**-0.051** -0.0020	**0.071** 0.0028	**500.000** 19.6850	**630.000** 24.8031	**-0.051** -0.0020	**0.102** 0.0040	**500.000** 19.6850	**and up**	**+0.203** +0.0080	**-0.584** -0.0230
630.000 24.8031	**800.000** 31.4961	**-0.076** -0.0030	**0.081** 0.0032	**630.000** 24.8031	**800.000** 31.4961	**-0.076** -0.0030	**0.119** 0.0047	– –	– –	– –	– –
800.000 31.4961	**1000.000** 39.3701	**-0.102** -0.0040	**0.089** 0.0035	**800.000** 31.4961	**1000.000** 39.3701	**-0.102** -0.0040	**0.140** 0.0055	– –	– –	– –	– –
1000.000 39.3701	**1250.000** 49.2126	**-0.127** -0.0050	**0.102** 0.0040	**1000.000** 39.3701	**1250.000** 49.2126	**-0.127** -0.0050	**0.163** 0.0064	– –	– –	– –	– –
– –	– –	– –	**1250.000** 49.2126	**1600.000** 62.9921	**-0.165** -0.0065	**0.193** 0.0076	– –	– –	– –	– –	– –
– –	– –	– –	**1600.000** 62.9921	**2000.000** 78.7402	**-0.203** -0.0080	**0.229** 0.009	– –	– –	– –	– –	– –

[1]Tolerance range is from +0 to value listed.

TAPERED ROLLER BEARING

Metric system bearings (ISO and J Prefix Parts)

Timken manufactures metric system bearings to six tolerance classes. Classes K and N are often referred to as standard classes. Class N has more closely controlled width tolerances than K. Classes C, B, A and AA are precision classes. These tolerances lie within those currently specified in ISO 492 with the exception of a small number of dimensions indicated in the tables. The differences normally have an insignificant effect on the mounting and performance of tapered roller bearings.

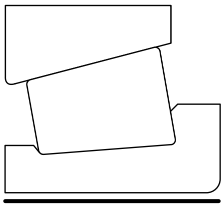


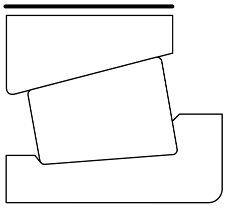
TABLE 20. TAPERED ROLLER BEARING TOLERANCES – INNER RING BORE (Metric)

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
	10.000 0.3937	**18.000** 0.7087	**0.000** 0.0000	**-0.012** -0.00047	**0.000** 0.0000	**-0.012** -0.00047	**0.000** 0.0000	**-0.007** -0.0002	**0.000** 0.0000	**-0.005** -0.0001	**0.000** 0.0000	**-0.005** -0.0001	**0.000** 0.0000	**-0.005** -0.0001
	18.000 0.7087	**30.000** 1.1811	**0.000** 0.0000	**-0.012** -0.0005	**0.000** 0.0000	**-0.012** -0.0005	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.006** -0.0002	**0.000** 0.0000	**-0.006** -0.0002	**0.000** 0.0000	**-0.006** -0.0002
	30.000 1.1811	**50.000** 1.9685	**0.000** 0.0000	**-0.012** -0.0005	**0.000** 0.0000	**-0.012** -0.0005	**0.000** 0.0000	**-0.010** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	50.000 1.9685	**80.000** 3.1496	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.012** -0.0005	**0.000** 0.0000	**-0.009** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	80.000 3.1496	**120.000** 4.7244	**0.000** 0.0000	**-0.020** -0.00079	**0.000** 0.0000	**-0.020** -0.00079	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.010** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	120.000 4.7244	**180.000** 7.0886	**0.000** 0.0000	**-0.025** -0.00098	**0.000** 0.0000	**-0.025** -0.00098	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.013** -0.0005	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	180.000 7.0866	**250.000** 9.8425	**0.000** 0.0000	**-0.030** -0.0012	**0.000** 0.0000	**-0.030** -0.0012	**0.000** 0.0000	**-0.022** -0.0009	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	250.000 9.8425	**265.000** 10.4331	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.022** -0.0009	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
TS TSF SR[1]	**265.000** 10.4331	**315.000** 12.4016	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.022** -0.0009	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	315.000 12.4016	**400.000** 15.7480	**0.000** 0.0000	**-0.040** -0.0016	**0.000** 0.0000	**-0.040** -0.0016	**0.000** 0.0000	**-0.025** -0.0010	– –	– –	– –	– –	– –	– –
	400.000 15.7480	**500.000** 19.6850	**0.000** 0.0000	**-0.045** -0.0018	**0.000** 0.0000	**-0.045** -0.0018	**0.000** 0.0000	**-0.025** -0.0010	– –	– –	– –	– –	– –	– –
	500.000 19.6850	**630.000** 24.8031	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.030** -0.0012	– –	– –	– –	– –	– –	– –
	630.000 24.8031	**800.000** 31.4961	**0.000** 0.0000	**-0.080** -0.0031	– –	– –	**0.000** 0.0000	**-0.040** -0.0014	– –	– –	– –	– –	– –	– –
	800.000 31.4961	**1000.000** 39.3701	**0.000** 0.0000	**-0.100** -0.0040	– –	– –	**0.000** 0.0000	**-0.050** -0.0020	– –	– –	– –	– –	– –	– –
	1000.000 39.3701	**1200.000** 47.2441	**0.000** 0.0000	**-0.130** -0.0051	– –	– –	**0.000** 0.0000	**-0.060** -0.0024	– –	– –	– –	– –	– –	– –
	1200.000 47.2441	**1600.000** 62.9921	**0.000** 0.0000	**-0.150** -0.0065	– –	– –	**0.000** 0.0000	**-0.080** -0.0031	– –	– –	– –	– –	– –	– –
	1600.000 62.9921	**2000.000** 78.7402	**0.000** 0.0000	**-0.200** -0.0079	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
	2000.000 78.7402	– –	**0.000** 0.0000	**-0.250** -0.0098	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –

[1]SR assemblies are manufactured to tolerance class N only.

TABLE 21. TAPERED ROLLER BEARING TOLERANCES – OUTER RING OUTSIDE DIAMETER (Metric)

Bearing Type	O.D.		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
	10.000 0.3937	**18.000** 0.7087	**0.000** 0.0000	- -	- -		- -	- -	- -	- -	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	18.000 0.7087	**30.000** 1.1811	**0.000** 0.0000	**-0.012** -0.00047	**0.000** 0.0000	**-0.012** -0.00047	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.0006** -0.0002	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	30.000 1.1811	**50.000** 1.9685	**0.000** 0.0000	**-0.014** -0.0005	**0.000** 0.0000	**-0.014** -0.0005	**0.000** 0.0000	**-0.009** -0.0004	**0.000** 0.0000	**-0.007** -0.0003	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	50.000 1.9685	**80.000** 3.1496	**0.000** 0.0000	**-0.016** -0.0006	**0.000** 0.0000	**-0.016** -0.0006	**0.000** 0.0000	**-0.011** -0.0004	**0.000** 0.0000	**-0.009** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	80.000 3.1496	**120.000** 4.7244	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.013** -0.0005	**0.000** 0.0000	**-0.010** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	120.000 4.7244	**150.000** 5.9055	**0.000** 0.0000	**-0.020** -0.00079	**0.000** 0.0000	**-0.020** -0.00079	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.011** -0.0004	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	150.000 5.9055	**180.000** 7.0866	**0.000** 0.0000	**-0.025** -0.00098	**0.000** 0.0000	**-0.025** -0.00098	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.013** -0.0005	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	180.000 7.0866	**250.000** 9.8425	**0.000** 0.0000	**-0.030** -0.0012	**0.000** 0.0000	**-0.030** -0.0012	**0.000** 0.0000	**-0.020** -0.0008	**0.000** 0.0000	**-0.015** -0.0006	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
TS TSF SR[1]	**250.000** 9.8425	**265.000** 10.4331	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.025** -0.0010	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	265.000 10.4331	**315.000** 12.4016	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.035** -0.0014	**0.000** 0.0000	**-0.025** -0.0010	**0.000** 0.0000	**-0.018** -0.0007	**0.000** 0.0000	**-0.008** -0.0003	**0.000** 0.0000	**-0.008** -0.0003
	315.000 12.4016	**400.000** 15.7480	**0.000** 0.0000	**-0.040** -0.0016	**0.000** 0.0000	**-0.040** -0.0016	**0.000** 0.0000	**-0.028** -0.0011	**0.000** 0.0000	**-0.020** -0.0008	– –	– –	– –	– –
	400.000 15.7480	**500.000** 19.6850	**0.000** 0.0000	**-0.045** -0.0018	**0.000** 0.0000	**-0.045** -0.0018	**0.000** 0.0000	**-0.030** -0.0012	– –	– –	– –	– –	– –	– –
	500.000 19.6850	**630.000** 24.8031	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.035** -0.0014	– –	– –	– –	– –	– –	– –
	630.000 24.8031	**800.000** 31.4961	**0.000** 0.0000	**-0.075** -0.0030	– –	– –	**0.000** 0.0000	**-0.040** *0.0016	– –	– –	– –	– –	– –	– –
	800.000 31.4961	**1000.000** 39.3701	**0.000** 0.0000	**-0.100** -0.0040	– –	– –	**0.000** 0.0000	**-0.050** -0.0020	– –	– –	– –	– –	– –	– –
	1000.000 39.3701	**1200.000** 47.2441	**0.000** 0.0000	**-0.130** -0.0051	– –	– –	**0.000** 0.0000	**-0.060** -0.0024	– –	– –	– –	– –	– –	– –
	1200.000 **47.2441**	**1600.000** **62.9921**	**0.000** **0.0000**	**-0.165** **-0.0065**	– –	– –	**0.000** 0.0000	**-0.080** -0.0031	– –	– –	– –	– –	– –	– –
	1600.000 62.9921	**2000.000** 78.7402	**0.000** 0.0000	**-0.200** -0.0079	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
	2000.000 78.7402	– –	**0.000** 0.0000	**-0.250** -0.0098	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –



[1]SR assemblies are manufactured to tolerance class N only.

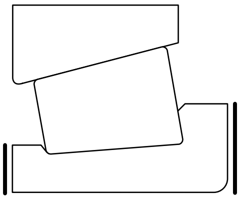


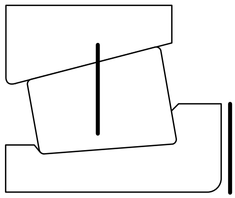
TABLE 22. TAPERED ROLLER BEARING TOLERANCES – INNER RING WIDTH (Metric)

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF	**10.000** 0.3937	**50.000** 1.9685	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079
	50.000 1.9685	**120.000** 4.7244	**0.000** 0.0000	**-0.150** -0.0059	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118
	120.000 4.7244	**180.000** 7.0866	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118
	180.000 7.0866	**250.000** 9.8425	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138
	250.000 **9.8425**	**265.000** **10.4331**	**0.000** **0.0000**	**-0.200** **-0.0079**	**0.000** **0.0000**	**-0.050** **-0.0020**	**0.000** **0.0000**	**-0.350** **-0.0138**	**0.000** **0.0000**	**-0.350** **-0.0138**	**0.000** **0.0000**	**-0.350** **-0.0138**	**0.000** **0.0000**	**-0.350** **-0.0138**
	265.000 10.4331	**315.000** 12.4016	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138
	315.000 12.4016	**500.000** 19.6850	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	500.000 19.6850	**630.000** 24.8031	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	630.000 24.8031	**1200.000** 47.2441	**0.000** 0.0000	**-0.300** -0.0118	– –	– –	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	1200.000 47.2441	**1600.000** 62.9921	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	1600.000 62.9921	– –	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –

TABLE 23. TAPERED ROLLER BEARING TOLERANCES – INNER RING STAND (Metric)

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF	**10.000** 0.3937	**80.000** 3.1496	**+0.100** +0.0039	**0.000** 0.0000	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039						
	80.000 3.1496	**120.000** 4.7244	**+0.100** +0.0039	**-0.100** -0.0039	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039						
	120.000 4.7244	**180.000** 7.0866	**+0.150** +0.0059	**-0.150** -0.0059	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039			(1)	(1)	(1)	(1)
	180.000 7.0866	**250.000** 9.8425	**+0.150** +0.0059	**-0.150** -0.0059	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059	(1)	(1)				
	250.000 9.8425	**265.000** 10.4331	**+0.150** +0.0059	**-0.150** -0.0059	**+0.100** +0.0039	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059						
	265.000 10.4331	**315.000** 12.4016	**+0.150** +0.0059	**-0.150** -0.0059	**+0.100** +0.0039	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059			– –	– –	– –	– –
	315.000 12.4016	**400.000** 15.7480	**+0.200** +0.0079	**-0.200** -0.0079	**+0.100** +0.0039	**0.000** 0.0000	**+0.150** +0.0059	**-0.150** -0.0059	– –	– –	– –	– –	– –	– –
	400.000 15.7480	– –	(1)	(1)	(1)	(1)	(1)	(1)	– –	– –	– –	– –	– –	– –

(1)These sizes manufactured as matched assemblies only.



Inner Ring Stand. Inner ring stand is a measure of the variation in inner ring raceway size, taper and roller diameter. This is checked by measuring the axial location of the reference surface of a master outer ring or other type gauge with respect to the reference inner ring face.

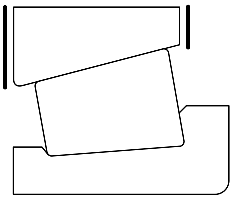


TABLE 24. TAPERED ROLLER BEARING TOLERANCES – OUTER RING WIDTH (Metric)

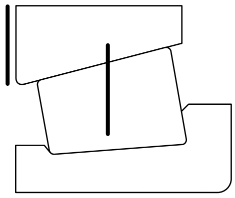
Bearing Types	O.D.		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.(1)	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF	**10.000** 0.3937	**80.000** 3.1496	**0.000** 0.0000	**-0.150** -0.0059	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.150** -0.0059	**0.000** 0.0000	**-0.150** -0.0059	**0.000** 0.0000	**-0.150** -0.0059	**0.000** 0.0000	**-0.150** -0.0059
	80.000 3.1496	**150.000** 5.9055	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.200** -0.0079
	150.000 5.9055	**180.000** 7.0866	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098
	180.000 7.0866	**250.000** 9.8425	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.250** -0.0098
	250.000 **9.8425**	**265.000** **10.4331**	**0.000** **0.0000**	**-0.250** **-0.0098**	**0.000** **0.0000**	**-0.100** **-0.0040**	**0.000** **0.0000**	**-0.300** **-0.0118**	**0.000** **0.0000**	**-0.300** **-0.0118**	**0.000** **0.0000**	**-0.300** **-0.0118**	**0.000** **0.0000**	**-0.300** **-0.0118**
	265.000 10.4331	**315.000** 12.4016	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118
	315.000 12.4016	**400.000** 15.7480	**0.000** 0.0000	**-0.250** -0.0098	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.300** -0.0118	– –	– –	– –	– –
	400.000 15.7480	**500.000** 19.6850	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	500.000 19.6850	**800.000** 31.4961	**0.000** 0.0000	**-0.300** -0.0118	**0.000** 0.0000	**-0.100** -0.0040	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	– –	– –	– –	– –
	800.000 31.4961	**1200.000** 47.2441	**0.000** 0.0000	**-0.350** -0.0138	– –	– –	**0.000** 0.0000	**-0.400** -0.0157	– –	– –	– –	– –	– –	– –
	1200.000 47.2441	**1600.000** 62.9921	**0.000** 0.0000	**-0.400** -0.0157	– –	– –	**0.000** 0.0000	**-0.400** -0.0157	– –	– –	– –	– –	– –	– –
	1600.000 62.9921	– –	**0.000** 0.0000	**-0.400** -0.0157	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –

(1)These differ slightly from tolerances in ISO 492. These differences normally have an insignificant effect on the mounting and performance of tapered roller bearings. The 30000 series ISO bearings also are available with the above parameter according to ISO 492.

TABLE 25. TAPERED ROLLER BEARING TOLERANCES – OUTER RING STAND (Metric)

Bearing Types	O.D.		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
	10.000 0.3937	**18.000** 0.7087	**+0.100** +0.0039	**0.000** 0.0000	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039						
	18.000 0.7087	**80.000** 3.1496	**+0.100** +0.0039	**0.000** 0.0000	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039						
	80.000 3.1496	**120.000** 4.7244	**+0.100** +0.0039	**-0.100** -0.0039	**+0.050** +0.0020	**0.000** 0.0000	**+0.100** +0.0039	**-0.100** -0.0039			(2)	(2)	(2)	(2)
TS TSF(1)	**120.000** 4.7244	**265.000** 10.4331	**+0.200** +0.0079	**-0.100** -0.0039	**+0.100** +0.0039	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059	(2)	(2)				
	265.000 10.4331	**315.000** 12.4016	**+0.200** +0.0079	**-0.100** -0.0039	**+0.100** +0.0039	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059						
	315.000 12.4016	**400.000** 15.7480	**+0.200** +0.0079	**-0.200** -0.0079	**+0.100** +0.0039	**0.000** 0.0000	**+0.100** +0.0039	**-0.150** -0.0059			– –	– –	– –	– –
	315.000 12.4016	**400.000** 15.7480	**+0.200** +0.0079	**-0.200** -0.0079	**+0.100** +0.0040	**0.000** 0.0000	**+0.150** +0.0059	**-0.150** -0.0059	– –	– –	– –	– –	– –	– –
	400.000 15.7480	– –	(2)	(2)	(2)	(2)	(2)	(2)	– –	– –	– –	– –	– –	– –

(1)Stand for flanged outer ring is measured from flange backface (seating face).
(2)These sizes manufactured as matched assemblies only.



Outer Ring Stand. Outer ring stand is a measure of the variation in outer ring I.D. size and taper. This is checked by measuring the axial location of the reference surface of a master plug or other type gauge with respect to the reference face of the outer ring.

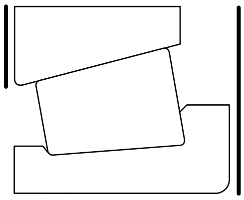


TABLE 26. TAPERED ROLLER BEARING TOLERANCES – OVERALL BEARING WIDTH (Metric)

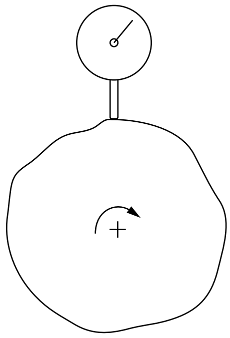
Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			K		N		C		B		A		AA	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF[1]	**10.000** 0.3937	**80.000** 3.1496	**+0.200** +0.0078	**0.000** 0.0000	**+0.100** +0.0039	**0.000** 0.0000	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078
	80.000 3.1496	**120.000** 4.7244	**+0.200** +0.0078	**-0.200** -0.0078	**+0.100** +0.0039	**0.000** 0.0000	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078	**+0.200** +0.0078	**-0.200** -0.0078
	120.000 4.7244	**180.000** 7.0866	**+0.350** +0.0137	**-0.250** -0.0098	**+0.150** +0.0059	**0.000** 0.0000	**+0.350** +0.0137	**-0.250** -0.0098	**+0.200** +0.0078	**-0.250** -0.0098	**+0.200** +0.0078	**-0.250** -0.0098	**+0.200** +0.0078	**-0.250** -0.0098
	180.000 7.0866	**250.000** 9.8425	**+0.350** +0.0137	**-0.250** -0.0098	**+0.150** +0.0059	**0.000** 0.0000	**+0.350** +0.0137	**-0.250** -0.0098	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118
	250.000 9.8425	**265.000** 10.4331	**+0.350** +0.0137	**-0.250** -0.0098	**+0.200** +0.0078	**0.000** 0.0000	**+0.350** +0.0137	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118
	265.000 10.4331	**315.000** 12.4016	**+0.350** +0.0137	**-0.250** -0.0098	**+0.200** +0.0078	**0.000** 0.0000	**+0.350** +0.0137	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118	**+0.200** +0.0078	**-0.300** -0.0118
	315.000 12.4016	**500.000** 19.6850	**+0.400** +0.0157	**-0.400** -0.0157	**+0.200** +0.0078	**0.000** 0.0000	**+0.350** +0.0137	**-0.300** -0.0118	– –	– –	– –	– –	– –	– –
	500.000 19.6850	**800.000** 31.4961	**+0.400** +0.0157	**-0.400** -0.0157	– –	– –	**+0.350** +0.0137	**-0.400** -0.0157	– –	– –	– –	– –	– –	– –
	800.000 31.4961	**1000.000** 39.3701	**+0.450** +0.0177	**-0.450** -0.0177	– –	– –	**+0.350** +0.0137	**-0.400** -0.0157	– –	– –	– –	– –	– –	– –
	1000.000 39.3701	**1200.000** 47.2441	**+0.450** +0.0177	**-0.450** -0.0177	– –	– –	**+0.350** +0.0137	**-0.450** -0.0177	– –	– –	– –	– –	– –	– –
	1200.000 47.2441	**1600.000** 62.9921	**+0.450** +0.0177	**-0.450** -0.0177	– –	– –	**+0.350** +0.0137	**-0.500** -0.0196	– –	– –	– –	– –	– –	– –
	1600.000 62.9921		**+0.450** +0.0177	**-0.450** -0.0177	– –	– –	– –	– –	– –	– –	– –	– –	– –	– –
SR[2]	**180.000** 7.0866	**250.000** 9.8425	**0.000** 0.0000	**-0.200** -0.0079	**0.000** 0.0000	**-0.050** -0.0020	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138	**0.000** 0.0000	**-0.350** -0.0138

[1]For bearing type TSF, the tolerance applies to the dimension T_1. Refer to the Tapered Roller Bearing Catalog available on www.timken.com.
[2]SR assemblies are manufactured to tolerance class N only.

TABLE 27. TAPERED ROLLER BEARING TOLERANCES – RADIAL RUNOUT (Metric)

Bearing Types	O.D.		Standard Bearing Class		Precision Bearing Class			
	Over	Incl.	K	N	C	B	A	AA
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF SR[1]	**10.000** 0.3937	**18.000** 0.7087	– –	– –	– –	– –	**0.002** 0.00008	**0.001** 0.00004
	18.000 0.7087	**30.000** 1.1811	**0.018** 0.0007	**0.018** 0.0007	**0.005** 0.0002	**0.003** 0.0001	**0.002** 0.00008	**0.001** 0.00004
	30.000 1.1811	**50.000** 1.9685	**0.020** 0.0008	**0.020** 0.0008	**0.006** 0.0002	**0.003** 0.0001	**0.002** 0.00008	**0.001** 0.00004
	50.000 1.9685	**80.000** 3.1496	**0.025** 0.0010	**0.025** 0.0010	**0.006** 0.0002	**0.004** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	80.000 3.1496	**120.000** 4.7244	**0.035** 0.0014	**0.035** 0.0014	**0.006** 0.0002	**0.004** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	120.000 4.7244	**150.000** 5.9055	**0.040** 0.0016	**0.040** 0.0016	**0.007** 0.0003	**0.004** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	150.000 5.9055	**180.000** 7.0866	**0.045** 0.0018	**0.045** 0.0018	**0.008** 0.0003	**0.004** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	180.000 7.0866	**250.000** 9.8425	**0.050** 0.0020	**0.050** 0.0020	**0.010** 0.0004	**0.005** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	250.000 9.8425	**265.000** 10.4331	**0.060** 0.0024	**0.060** 0.0024	**0.011** 0.0004	**0.005** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	265.000 10.4331	**315.000** 12.4016	**0.060** 0.0024	**0.060** 0.0024	**0.011** 0.0004	**0.005** 0.0002	**0.002** 0.00008	**0.001** 0.00004
	315.000 12.4016	**400.000** 15.7480	**0.070** 0.0028	**0.070** 0.0028	**0.013** 0.0005	**0.005** 0.0002	– –	– –
	400.000 15.7480	**500.000** 19.6850	**0.080** 0.0031	**0.080** 0.0031	– –	– –	– –	– –
	500.000 19.6850	**630.000** 24.8031	**0.100** 0.0039	– –	– –	– –	– –	– –
	630.000 24.8031	**800.000** 31.4961	**0.120** 0.0047	– –	– –	– –	– –	– –
	800.000 31.4961	**1000.000** 39.3701	**0.140** 0.0055	– –	– –	– –	– –	– –
	1000.000 39.3701	**1200.000** 47.2441	**0.160** 0.0063	– –	– –	– –	– –	– –
	1200.000 47.2441	**1600.000** 62.9921	**0.180** 0.0071	– –	– –	– –	– –	– –
	1600.000 62.9921	**2000.000** 78.7402	**0.200** 0.0079	– –	– –	– –	– –	– –
	2000.000 78.7402	– –	**0.200** 0.0079	– –	– –	– –	– –	– –

[1]SR assemblies are manufactured to tolerance class N only.



Runout. Runout is a measure of rotational accuracy expressed by Total Indicator Reading (T.I.R.). Total displacement is measured by an instrument sensing against a moving surface, or moved with respect to a fixed surface. A radial runout measurement includes both roundness errors and the centering error of the surface that the instrument head senses against.

INCH SYSTEM

TAPERED ROLLER BEARINGS

Inch system bearings are manufactured to a number of tolerance classes. Classes 4 and 2 are often referred to as standard classes. Classes 3, 0, 00 and 000 are precision classes. Inch system bearings conform to ABMA standard 19.2.

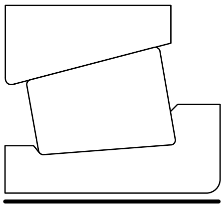


TABLE 28. TAPERED ROLLER BEARING TOLERANCES – INNER RING BORE (Inch)

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF TSL[1] TDI TDIT TDO TNA	**0.000** 0.0000	**76.200** 3.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000
	76.200 3.0000	**304.800** 12.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000
	304.800 12.0000	**609.600** 24.0000	– –	– –	**+0.051** +0.0020	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	609.600 24.0000	**914.400** 36.0000	**+0.076** +0.0030	**0.000** 0.0000	– –	– –	**+0.038** +0.0015	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	914.400 36.0000	**1219.200** 48.0000	**+0.102** +0.0040	**0.000** 0.0000	– –	– –	**+0.051** +0.0020	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	1219.200 48.0000	– –	**+0.127** +0.0050	**0.000** 0.0000	– –	– –	**+0.076** +0.0030	**0.000** 0.0000	– –	– –	– –	– –	– –	– –

(1)For TSL bearings these are the normal tolerances of the inner ring bore. However, bore size can be slightly reduced at large end due to tight fit assembly of the seal on the rib. This should not have any effect on the performance of the bearing.

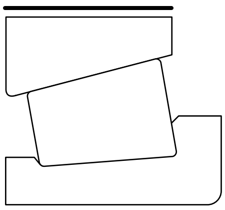


TABLE 29. TAPERED ROLLER BEARING TOLERANCES – OUTER RING OUTSIDE DIAMETER (Inch)

Bearing Types	O.D.		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF TSL TDI TDIT TDO TNA TNASW TNASWE	**0.000** 0.0000	**304.800** 12.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000	**+0.008** +0.0003	**0.000** 0.0000
	304.800 12.0000	**609.600** 24.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	609.600 24.0000	**914.400** 36.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.038** +0.0015	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	914.400 36.0000	**1219.200** 48.0000	**+0.102** +0.0040	**0.000** 0.0000	– –	– –	**+0.051** +0.0020	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	1219.200 48.0000	– –	**+0.127** +0.0050	**0.000** 0.0000	– –	– –	**+0.076** +0.0030	**0.000** 0.0000	– –	– –	– –	– –	– –	– –

TABLE 30. TAPERED ROLLER BEARING TOLERANCES – OUTER RING FLANGE (Inch)

Bearing Types	O.D.		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TSF	**0.000** 0.0000	**304.800** 12.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.052** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000
	304.800 12.0000	**609.600** 24.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000	**+0.051** +0.0020	**0.000** 0.0000
	609.600 24.0000	**914.400** 36.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**0.000** 0.0000	– –	– –	– –	– –	– –	– –
	914.400 36.0000	– –	**+0.127** +0.0050	**0.000** 0.0000	– –	– –	**+0.127** +0.0050	**0.000** 0.0000	– –	– –	– –	– –	– –	– –

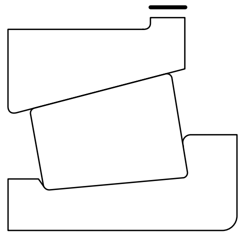


TABLE 31. TAPERED ROLLER BEARING TOLERANCES – INNER RING WIDTH (Inch)

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF TSL 2S TDI TDIT TDO	All Sizes		**+0.076** +0.0030	**-0.254** -0.0100	**+0.076** +0.0030	**-0.254** -0.0100	**+0.076** +0.0030	**-0.254** -0.0100	**+0.076** +0.0030	**-0.254** -0.0100	**+0.076** +0.0030	**-0.254** -0.0100	**+0.076** +0.0030	**-0.254** -0.0100

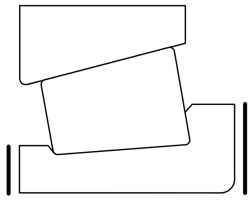


TABLE 32. TAPERED ROLLER BEARING TOLERANCES – OUTER RING WIDTH (Inch)

Bearing Types	O.D.		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
All Types	All Sizes		**+0.051** +0.0020	**-0.254** -0.0100	**+0.051** +0.0020	**-0.254** -0.0100	**+0.051** +0.0020	**-0.254** -0.0100	**+0.051** +0.0020	**-0.254** -0.0100	**+0.051** +0.0020	**-0.254** -0.0100	**+0.051** +0.0020	**-0.254** -0.0100

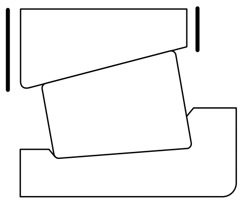
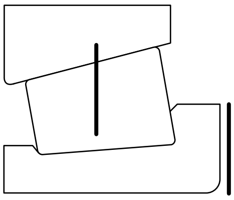


TABLE 33. TAPERED ROLLER BEARING TOLERANCES – INNER RING STAND (Inch)

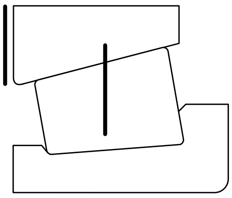


Inner Ring Stand. Inner ring stand is a measure of the variation in inner ring raceway size, taper and roller diameter. This is checked by measuring the axial location of the reference surface of a master outer ring or other type gauge with respect to the reference inner ring face.

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF TSL 2S TDI[1] TDIT[1] TDO	**0.000** 0.0000	**101.600** 4.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**-0.102** -0.0040	(2)	(2)	(2)	(2)	(2)	(2)
	101.600 4.0000	**266.700** 10.5000	**+0.152** +0.0060	**-0.152** -0.0060	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**+0.102** -0.0040						
	266.700 10.5000	**304.800** 12.0000	**+0.152** +0.0060	**-0.152** -0.0060	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**-0.102** -0.0040			– –	– –	– –	– –
	304.800 12.0000	**406.400** 16.0000	– –	– –	**+0.178** +0.0070	**-0.178** -0.0070	**+0.178** +0.0070	**-0.178** -0.0070	– –	– –	– –	– –	– –	– –
	406.400 16.0000	– –	(2)	(2)	(2)	(2)	(2)	(2)	– –	– –	– –	– –	– –	– –

[1] For class 2, TDI and TDIT bearings with an inner ring bore of 101.600 to 304.800 mm (4.0000 to 12.0000 in.), the inner ring stand is ±0.102 mm (±0.0040 in.).
[2] These sizes manufactured as matched assemblies only.

TABLE 34. TAPERED ROLLER BEARING TOLERANCES – OUTER RING STAND (Inch)



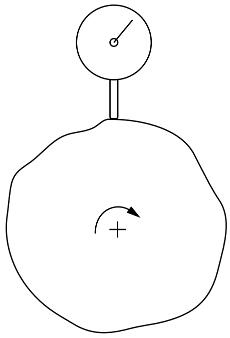
Outer Ring Stand. Outer ring stand is a measure of the variation in outer ring I.D. size and taper. This is checked by measuring the axial location of the reference surface of a master plug or other type gauge with respect to the reference face of the outer ring.

Bearing Types	Bore		Standard Bearing Class				Precision Bearing Class							
			4		2		3		0		00		000	
	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.	**mm** in.
TS TSF[1] TSL TDI TDIT	**0.000** 0.0000	**101.600** 4.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**-0.102** -0.0040	(2)	(2)	(2)	(2)	(2)	(2)
	101.600 4.0000	**266.700** 10.5000	**+0.203** +0.0080	**-0.102** -0.0040	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**-0.102** -0.0040						
	266.700 10.5000	**304.800** 12.0000	**+0.203** +0.0080	**-0.102** -0.0040	**+0.102** +0.0040	**0.000** 0.0000	**+0.102** +0.0040	**-0.102** -0.0040			– –	– –	– –	– –
	304.800 12.0000	**406.400** 16.0000	**+0.203** +0.0080	**-0.203** -0.0080	**+0.203** +0.0080	**-0.203** -0.0080	**+0.203** +0.0080	**-0.203** -0.0080	– –	– –	– –	– –	– –	– –
	406.400 16.0000	– –	(2)	(2)	(2)	(2)	(2)	(2)	– –	– –	– –	– –	– –	– –

[1] Stand for flanged outer ring is measured from flange backface (seating face).
[2] These sizes manufactured as matched assemblies only.

TABLE 35. TAPERED ROLLER BEARING TOLERANCES – RADIAL RUNOUT (Inch)

Bearing Types	O.D.		Standard Bearing Class		Precision Bearing Class			
	Over	Incl.	4	2	3	0	00	000
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF TSL 2S TDI TDIT TDO TNA TNASW TNASWE	**0.000** 0.0000	**266.700** 10.5000	**0.051** 0.0020	**0.038** 0.0015	**0.008** 0.0003	**0.004** 0.00015	**0.002** 0.000075	**0.001** 0.000040
	266.700 10.5000	**304.800** 12.0000	**0.051** 0.0020	**0.038** 0.0015	**0.008** 0.0003	**0.004** 0.00015	**0.002** 0.000075	**0.001** 0.000040
	304.800 12.0000	**609.600** 24.0000	**0.051** 0.0020	**0.038** 0.0015	**0.018** 0.0007	– –	– –	– –
	609.600 24.0000	**914.400** 36.0000	**0.076** 0.0030	**0.051** 0.0020	**0.051** 0.0020	– –	– –	– –
	914.400 36.0000	– –	**0.076** 0.0030	– –	**0.076** 0.0030	– –	– –	– –



Runout. Runout is a measure of rotational accuracy expressed by Total Indicator Reading (T.I.R.). Total displacement is measured by an instrument sensing against a moving surface, or moved with respect to a fixed surface. A radial runout measurement includes both roundness errors and the centering error of the surface that the instrument head senses against.

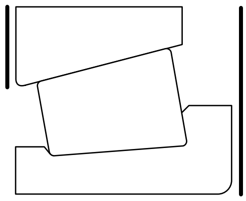
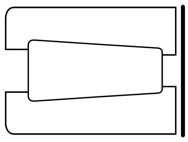


TABLE 36. TAPERED ROLLER BEARING TOLERANCES – OVERALL BEARING WIDTH (Inch)

Bearing Types	Bore		O.D.		Standard Bearing Class				Precision Bearing Class							
					4		2		3		0		00		000	
	Over	Incl.	Over	Incl.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
TS TSF[1] TSL	0.000 0.0000	101.600 4.0000	– –	– –	+0.203 +0.0080	0.000 0.0000	+0.203 +0.0080	0.000 0.0000	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080
	101.600 4.0000	304.800 12.0000	– –	– –	+0.356 +0.0140	-0.254 -0.0100	+0.203 +0.0080	0.000 0.0000	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080	+0.203 +0.0080	-0.203 -0.0080
	304.800 12.0000	609.600 24.0000	0.000 0.0000	508.000 20.0000	– –	– –	+0.381 +0.0150	-0.381 -0.0150	+0.203 +0.0080	-0.203 -0.0080	– –	– –	– –	– –	– –	– –
	304.800 12.0000	609.600 24.0000	508.000 20.0000	– –	– –	– –	+0.381 +0.0150	-0.381 -0.0150	+0.381 +0.0150	-0.381 -0.0150	– –	– –	– –	– –	– –	– –
	609.600 24.0000	– –	– –	– –	+0.381 +0.0150	-0.381 -0.0150	– –	– –	+0.381 +0.0150	-0.381 -0.0150	– –	– –	– –	– –	– –	– –
TNA TNASW TNASWE	0.000 0.0000	127.000 5.0000	– –	– –	– –	– –	+0.254 +0.0100	0.000 0.0000	+0.254 +0.0100	0.000 0.0000	– –	– –	– –	– –	– –	– –
	127.000 5.0000	– –	– –	– –	– –	– –	+0.762 +0.0300	0.000 0.0000	+0.762 +0.0300	0.000 0.0000	– –	– –	– –	– –	– –	– –
TDI TDIT TDO	0.000 0.0000	101.600 4.0000	– –	– –	+0.406 +0.0160	0.000 0.0000	+0.406 +0.0160	0.000 0.0000	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160
	101.600 4.0000	304.800 12.0000	– –	– –	+0.711 +0.0280	-0.508 -0.0200	+0.406 +0.0160	-0.203 -0.0080	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160	+0.406 +0.0160	-0.406 -0.0160
	304.800 12.0000	609.600 24.0000	0.000 0.0000	508.000 20.0000	– –	– –	+0.762 +0.0300	-0.762 -0.0300	+0.406 +0.0160	-0.406 -0.0160	– –	– –	– –	– –	– –	– –
	304.800 12.0000	609.600 24.0000	508.000 20.0000	– –	– –	– –	+0.762 +0.0300	-0.762 -0.0300	+0.762 +0.0300	-0.762 -0.0300	– –	– –	– –	– –	– –	– –
	609.600 24.0000	– –	– –	– –	+0.762 +0.0300	-0.762 -0.0300	– –	– –	+0.762 +0.0300	-0.762 -0.0300	– –	– –	– –	– –	– –	– –
2S	0.000 0.0000	101.600 4.0000	– –	– –	+0.457 +0.0180	-0.051 -0.0020	+0.457 +0.0180	-0.051 -0.0020	– –	– –	– –	– –	– –	– –	– –	– –

[1]For bearing type TSF, the tolerance applies to the dimension T_1. Refer to the Tapered Roller Bearing Catalog available on www.timken.com.

TABLE 37. THRUST TAPERED ROLLER BEARING TOLERANCES – BORE (Inch)



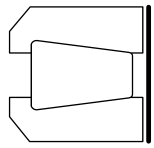
TTHD, TTHDFL, TTVS

TTHD, TTHDFL, TTVS

Bore Range		Bearing Class			
		Precision 2		Precision 3	
Over	Incl.	Over	Incl.	Max.	Min.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
0.000 0.0000	**304.800** 12.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000
304.800 12.0000	**609.600** 24.0000	**+0.051** 0.0020	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000
609.600 24.0000	**914.400** 36.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.038** +0.0015	**0.000** 0.0000
914.400 36.0000	**1219.200** 48.0000	**+0.102** +0.0040	**0.000** 0.0000	**+0.051** 0.0020	**0.000** 0.0000
1219.200 48.0000	– –	**+0.127** +0.0050	**0.000** 0.0000	**+0.076** +0.030	**0.000** 0.0000

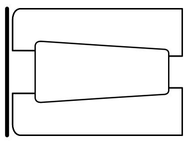
TTC, TTSP – CLASS 4

Bore Range		Deviation Precision 4	
Over	Incl.	Over	Incl.
mm in.	mm in.	mm in.	mm in.
0.000 0.0000	**25.400** 1.0000	**+0.076** +0.0030	**-0.076** -0.0030
25.400 1.0000	**76.200** 3.0000	**+0.102** +0.0040	**-0.102** -0.0040
76.200 3.0000	– –	**+0.127** +0.0050	**-0.127** -0.0050



TTC, TTSP

TABLE 38. THRUST TAPERED ROLLER BEARING TOLERANCES – OUTSIDE DIAMETER (Inch)



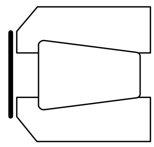
TTHD, TTHDFL, TTVS

TTHD, TTHDFL, TTVS

Outside Diameter Range		Bearing Class			
		Precision 2		Precision 3	
Over	Incl.	Over	Incl.	Max.	Min.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
0.000 0.0000	**304.800** 12.0000	**+0.025** +0.0010	**0.000** 0.0000	**+0.013** +0.0005	**0.000** 0.0000
304.800 12.0000	**609.600** 24.0000	**+0.051** 0.0020	**0.000** 0.0000	**+0.025** +0.0010	**0.000** 0.0000
609.600 24.0000	**914.400** 36.0000	**+0.076** +0.0030	**0.000** 0.0000	**+0.038** +0.0015	**0.000** 0.0000

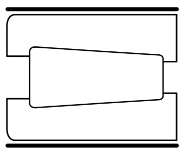
TTC, TTSP – CLASS 4

Outside Diameter Range		Deviation Precision 4	
Over	Incl.	Over	Incl.
mm in.	mm in.	mm in.	mm in.
0.000 0.0000	**127.000** 5.0000	**+0.254** +0.0100	**0.000** 0.0000
127.000 5.0000	**203.200** 8.0000	**+0.381** +0.0150	**0.000** 0.0000
203.200 8.0000	– –	**+0508** +0.200	**0.000** 0.0000



TTC, TTSP

TABLE 39. THRUST TAPERED ROLLER BEARING TOLERANCES – WIDTH (Inch)



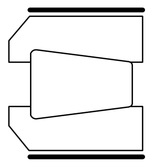
TTHD, TTHDFL, TTVS

TTHD, TTHDFL, TTVS

Width Range		Bearing Class			
		Precision 2		Precision 3	
Over	Incl.	Over	Incl.	Max.	Min.
mm in.	mm in.	mm in.	mm in.	mm in.	mm in.
All Sizes		**+0.381** +0.0150	**-0.381** -0.0150	**+0.203** +0.0080	**-0.203** -0.0080

TTC, TTSP – CLASS 4

Width Range		Deviation Precision 4	
Over	Incl.	Over	Incl.
mm in.	mm in.	mm in.	mm in.
0.000 0.0000	**76.200** 3.0000	**+0.254** +0.0100	**-0.254** -0.0100
76.200 3.0000	**127.000** 5.0000	**+0.381** +0.0150	**-0.381** -0.0150
127.000 5.0000	– –	**+0508** +0.200	**-0.508** -0.0200



TTC, TTSP

MOUNTING DESIGN, FITTING PRACTICE, SETTING AND INSTALLATION

To achieve expected bearing performance, it is critical that proper mounting design, fitting practices, settings and installation procedures are followed. While there are differences between tapered roller, cylindrical roller, spherical roller, radial ball and angular contact ball bearings relative to these practices, there are many similarities that apply to all. These similarities are summarized in the sections below, followed by a summary of practices specific to each bearing type.

MOUNTING

All bearing types are typically mounted onto a shaft and into a housing wherein the shaft and housing have shoulders to back the rings. The purpose of the shoulder is to positively establish the axial location and alignment of the bearing under all operating conditions. Various types of backing shoulder designs can be used as shown in fig. 77. The conventional method uses a shoulder machined on a shaft or in the housing. In some applications, snap rings are used as the shoulder. For either solid shoulder or snap ring designs, spacers can be used between the bearing raceway and shoulder if necessary. It is essential that a shoulder be square with the bearing ring and of sufficient diameter to provide adequate backing of the bearing raceway. It also must be of sufficient section to resist axial movement under loading, and must be wear resistant at the interface with the bearing.

It is highly recommended that roller bearing shaft seats be ground to a surface finish of 1.6 μm (65 μin) Ra maximum. Ball bearing seats should be 0.8 μm (32 μin) for shafts under 2 inches and 1.6 μm (65 μin) for all other sizes.

When shaft seats are turned, a tighter heavy-duty fit should be used. The shaft diameter should be turned to a finish of 3.2 μm (125 μin) Ra maximum.

Housing bores should be finished to 3.2 μm (125 μin) Ra maximum.

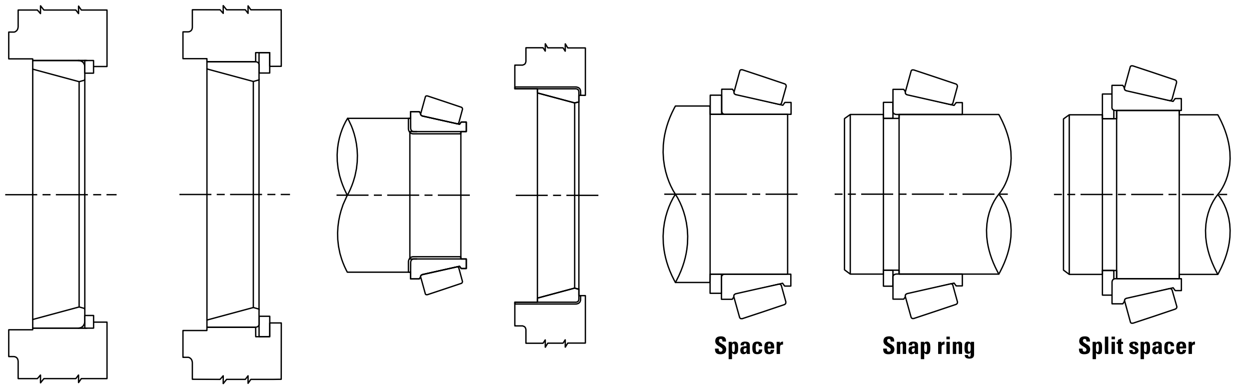


Fig. 77. Backing designs.

> ⚠ **WARNING**
> ***Failure to observe the following warnings could create a risk of death or serious injury.***
>
> Proper maintenance and handling practices are critical. Always follow installation instructions and maintain proper lubrication.
>
> Never spin a bearing with compressed air. The rollers may be forcefully expelled.

FITTING PRACTICE

As a general guideline, bearing rings mounted on a rotating member should have an interference fit. Loose fits may permit the ring to creep or turn and wear the mating surface and backing shoulder. This wear can result in excessive bearing looseness and damage to the bearing, shaft or housing.

The choice of fitting practices will mainly depend upon the following parameters:

- Precision class of the bearing.
- Rotating or stationary ring.
- Type of layout (single- or double-row bearings).
- Type and direction of load (continuous/alternate rotating).
- Particular running conditions like shocks, vibrations, over-loading or high speed.
- Capability for machining the seats (grinding, turning or boring).
- Shaft and housing section and material.
- Mounting and setting conditions.

Fig. 78 is a graphical representation of roller bearing shaft and housing fit selection that conforms to accepted industry standards and practices. The bars designated g6, h6, etc., represent shaft/housing diameter and tolerance ranges to achieve various loose and interference fits required for various load and ring rotation conditions.

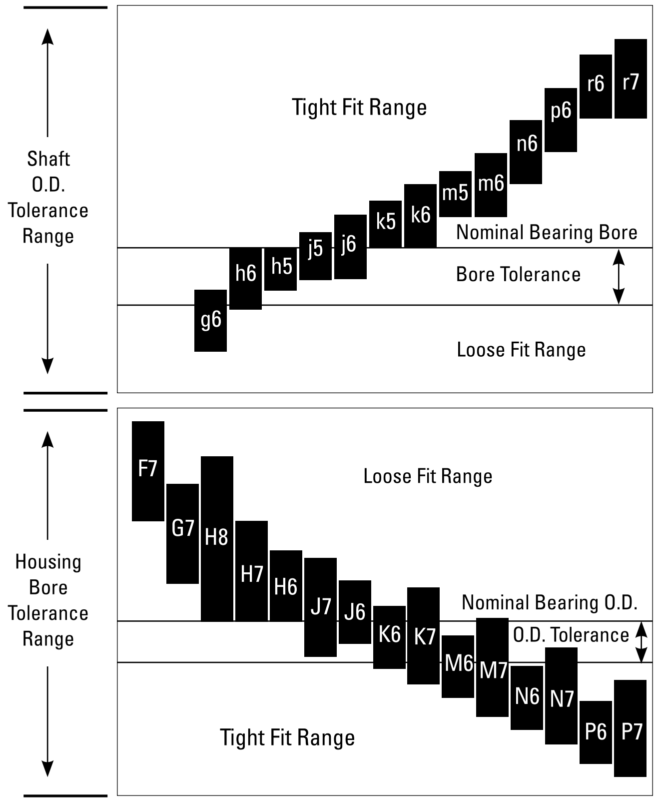


Fig. 78. Shaft and housing fit selection.