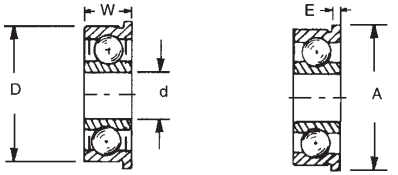
BEARING TOLERANCES

The Annular Bearing Engineers Committee (ABEC) has established standards that divide precision ball bearings into quality classes. For most applications ABEC 1 or ABEC 3 bearings will offer significant accuracy. But, there are times when highly precise position is required. In these applications ABEC 5 or ABEC 7 bearings should be specified.

This page refers to ABEC tolerances that affect the mounting dimensions of ball bearings. The following page discusses tolerances that influence the operation of the bearings.



Outer Ring Tolerances

Outside Diameter (D)		Tolerance															
		D +0.0000				W +0.0000				A				E +0.0000			
OVER	INCL.	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 1	ABEC 3	ABEC 5	ABEC 7
0	.7087	-.0003	-.0003	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010	—	+.0050 -.0020	+.0000 -.0010	+.0000 -.0010	—	-.0020	-.0020	-.0020
.7087	1.1811	-.0004	-.0003	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010	—	+.0050 -.0020	+.0000 -.0010	+.0000 -.0010	—	-.0020	-.0020	-.0020
1.1811	1.9685	-.0005	-.0003	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010	—	+.0050 -.0020	+.0000 -.0010	+.0000 -.0010	—	-.0020	-.0020	-.0020
1.9685	3.1496	-.0005	-.0004	-.0003	-.0002	-.0050	-.0050	-.0015	-.0010	—	—	—	—	—	—	—	—

Inner Ring Tolerances

Bore Diameter (d)		Tolerance							
		d +0.0000				W +0.0000			
OVER	INCL.	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 1	ABEC 3	ABEC 5	ABEC 7
0	.3937	-.0003	-.0002	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010
.3937	.7087	-.0003	-.0002	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010
.7087	1.1811	-.0004	-.0002	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010
1.1811	1.9685	-.0005	-.0003	-.0002	-.0002	-.0050	-.0050	-.0010	-.0010

BEARING TOLERANCES

The following tolerances illustrate the differences between ABEC quality classes that could affect the performance of your assembly. These tolerances should be strongly considered if a high precision gear train is your goal.

Outer Ring Tolerances

		Tolerance													
Outside Diameter (D)		Radial Runout (max.)				Width Variation (max.)		Outside Cylindrical Surface Runout with Reference Side (max.)		Groove Runout with Reference Side (max.)		Outer Diameter 2 Point Out Of Round (max.)		Outer Diameter Taper (max.)	
OVER	INCL.	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7
0	.7087	.0006	.0004	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.0002	.0001	.0001	.0001	.0001
.7087	1.1811	.0006	.0004	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.0002	.0001	.0001	.0001	.0001
1.1811	1.9685	.0008	.0004	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.0002	.0001	.0001	.0001	.0001
1.9685	3.1496	.0010	.0005	.0003	.0002	.0002	.00015	.0003	.00015	.0004	.0002	—	—	—	—

Inner Ring Tolerances

		Tolerance													
Bore Diameter (d)		Radial Runout (max.)				Width Variation (max.)		Reference Runout with Bore (max.)		Groove Runout with Reference Side (max.)		Bore 2-Point Out Of Round (max.)		Bore Taper (max.)	
OVER	INCL.	ABEC 1	ABEC 3	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7	ABEC 5	ABEC 7
0	.3937	.0003	.0002	.00015	.0001	.0002	.0001	.0003	.0001	.0003	.0001	.0001	.0001	.0001	.0001
.3937	.7087	.0004	.0003	.00015	.0001	.0002	.0001	.0003	.0001	.0003	.0001	.0001	.0001	.0001	.0001
.7087	1.1811	.0005	.0003	.00015	.00015	.0002	.0001	.0003	.00015	.0003	.00015	.0001	.0001	.0001	.0001
1.1811	1.9685	.0006	.0004	.0002	.00015	.0002	.0001	.0003	.00015	.0003	.00015	—	—	—	—