



## Bearing Tolerances

In the United States, the American Bearing Manufacturers Association (**ABMA**) maintains the standards deemed necessary by its bearing industry member companies. This includes revising existing, or proposing and preparing new standards. These standards are then proposed to the American National Standards Institute (**ANSI**) for approval as US national standards. ANSI has a committee consisting of representatives from user organizations, manufacturers, and the US government that are devoted to rolling bearing standards activities.

Tolerance classes for ball bearings were defined by a committee within the ABMA known as the “Annular Bearings Engineers Committee” (**ABEC**). These tolerances are commonly referred to as ABEC rating, or grade. Tolerance classes for roller bearings are covered by the **RBEC** classifications contained within the same standard. These classes are defined in ABMA standard 20 – Radial Bearings of Ball, Cylindrical Roller, and Spherical Roller Types and ABMA standards 12.1 and 12.2 – Instrument Ball Bearings. The ABEC (and RBEC) tolerance classifications specify both tolerances of size and form for the individual inner and outer rings. The critical features of the rings include the bore (or inner diameter of the inner ring), the outer diameter of the outer ring, the ring widths, and the raceways of each ring. Tolerances of form include roundness, taper, runout, and parallelism.

ABMA standard 20 defines 5 classes: ABEC 1, ABEC 3, ABEC 5, ABEC 7, and ABEC 9. Instrument series ball bearings are defined in standards 12.1 and 12.2 and carry the suffix “P”. Extra thin and thin section ball bearings defined in standards 12.1 and 12.2 carry the suffix “T”. The higher the number of the classification, the tighter the tolerances become resulting in higher precision of the assembled bearing. When the classification system was first set up, machine tool technology was such that manufacturers mass produced only ABEC 1, and sometimes ABEC 3. Bearings for the higher classifications were selected from the production runs of the lower classification. Today, the technology has advanced to the point where manufacturers can produce ABEC 7 and ABEC 9 bearings routinely.

While all bearings are extremely precise mechanisms, a designer must consider the benefits of tighter tolerances in terms of performance and bearing life. For example, there is a direct correlation with precision class and bearing life. Raceway parallelism, a feature controlled by ABEC, can impact bearing torque. A non-parallel raceway will result in torque spikes. In high speed applications, bearing runout can result in an imbalance in the rotating mass. These conditions can lead to premature failure and unpredictable life. Of course, the higher precision levels have the downside of higher cost.

While the bearing tolerance classes primarily control boundary dimensions of the rings, it should also be noted that there are features that are critical to the bearings performance and life that are not controlled by the ABEC (or ISO) specifications. These include: internal clearance, surface finish, ball accuracy, torque, noise, cage type, and lubrication. These items should be specified along with the precision class when selecting bearings to ensure optimum life and performance. In many cases, it is one of these features, not precision level, that when specified properly yields the desired performance and or life.

Many countries throughout the world have their own standards organizations. For example, Germany, Japan, Korea, Russia, and China are major bearing producers and all have industrial standards that cover ball and roller bearings. In almost all cases, these standards are similar to or state equivalency with ISO 492. The Table below shows the equivalent tolerance grades for three of the most common standards.



# TECHNICAL INFORMATION



## Bearing Classes by Standard

ANSI Standard 20	ISO 492	DIN 620
ABEC 1	Class Normal	P0
ABEC 3	Class 6	P6
ABEC 5	Class 5	P5
ABEC 7	Class 4	P4
ABEC 9	Class 2	P2

The following tables list the actual ABEC and RBEC tolerances per ABMA Standard 20. The tables list tolerances for both inner and outer rings, in both inch and metric units. These tables are useful in determining sizes and tolerance for components, such as shafts and housings. The designer should always do a tolerance stack up study at both maximum and least material conditions when sizing components, particularly when designing for miniature ball bearings. Some tolerances have been omitted for clarity. Tolerances for tapered roller bearings can be found in ABMA Standard 19.1 and are not included in these tables.



# TECHNICAL INFORMATION



Table IA

**Tolerance Class ABEC-1, RBEC-1  
(ISO Class Normal)  
Inner Ring**

English

Tolerance values in 0.0001 inch

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_s$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-3	4	0	-16	-
2.5	10	0.0984	0.3937	0	-3	4	0	-47	-98
10	18	0.3937	0.7087	0	-3	4	0	-47	-98
18	30	0.7087	1.1811	0	-4	5	0	-47	-98
30	50	1.1811	1.9685	0	-4.5	6	0	-47	-98
50	80	1.9685	3.1496	0	-6	8	0	-59	-150
80	120	3.1496	4.7244	0	-8	10	0	-79	-150
120	180	4.7244	7.0866	0	-10	12	0	-98	-197
180	250	7.0866	9.8425	0	-12	16	0	-118	-197
250	315	9.8425	12.4016	0	-14	20	0	-138	-197
315	400	12.4016	15.7480	0	-16	24	0	-157	-248

Metric

Tolerance values in micrometers

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_s$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-8	10	0	-40	-
2.5	10	0.0984	0.3937	0	-8	10	0	-120	-250
10	18	0.3937	0.7087	0	-8	10	0	-120	-250
18	30	0.7087	1.1811	0	-10	13	0	-120	-250
30	50	1.1811	1.9685	0	-12	15	0	-120	-250
50	80	1.9685	3.1496	0	-15	20	0	-150	-380
80	120	3.1496	4.7244	0	-20	25	0	-200	-380
120	180	4.7244	7.0866	0	-25	30	0	-250	-500
180	250	7.0866	9.8425	0	-30	40	0	-300	-500
250	315	9.8425	12.4016	0	-35	50	0	-350	-500
315	400	12.4016	15.7480	0	-40	60	0	-400	-630



# TECHNICAL INFORMATION



Table IB

Tolerance Class ABEC-1, RBEC-1  
(ISO Class Normal)  
Outer Ring

English

Tolerance values in 0.0001 inch

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
2.5	6	0.0984	0.2362	0	-3	6	Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-3	6			
18	30	0.7087	1.1811	0	-3.5	6			
30	50	1.1811	1.9685	0	-4.5	8			
50	80	1.9685	3.1496	0	-5	10			
80	120	3.1496	4.7244	0	-6	14			
120	150	4.7244	5.9055	0	-7	16			
150	180	5.9055	7.0866	0	-10	18			
180	250	7.0866	9.8425	0	-12	20			
250	315	9.8425	12.4016	0	-14	24			
315	400	12.4016	15.7480	0	-16	28			
400	500	15.7480	19.6850	0	-18	31			
500	630	19.6850	24.8031	0	-20	39			
630	800	24.8031	31.4961	0	-30	47			
800	1000	31.4961	39.3701	0	-39	55			



# TECHNICAL INFORMATION



Table IB (continued)

Tolerance Class ABEC-1, RBEC-1  
(ISO Class Normal)  
Outer Ring

Metric Tolerance values in micrometers

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_S$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
2.5	6	0.0984	0.2362	0	-8	15	Identical to Width Tolerance ( $\Delta B_S$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-8	15			
18	30	0.7087	1.1811	0	-9	15			
30	50	1.1811	1.9685	0	-11	20			
50	80	1.9685	3.1496	0	-13	25			
80	120	3.1496	4.7244	0	-15	35			
120	150	4.7244	5.9055	0	-18	40			
150	180	5.9055	7.0866	0	-25	45			
180	250	7.0866	9.8425	0	-30	50			
250	315	9.8425	12.4016	0	-35	60			
315	400	12.4016	15.7480	0	-40	70			
400	500	15.7480	19.6850	0	-45	80			
500	630	19.6850	24.8031	0	-50	100			
630	800	24.8031	31.4961	0	-75	120			
800	1000	31.4961	39.3701	0	-100	140			



# TECHNICAL INFORMATION



Table II A

## Tolerance Class ABEC-3, RBEC-3 (ISO Class 6) Inner Ring

English

Tolerance values in 0.0001 inch

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-3	2	0	-16	-
2.5	10	0.0984	0.3937	0	-3	2.5	0	-47	-98
10	18	0.3937	0.7087	0	-3	3	0	-47	-98
18	30	0.7087	1.1811	0	-3	3	0	-47	-98
30	50	1.1811	1.9685	0	-4	4	0	-47	-98
50	80	1.9685	3.1496	0	-4.5	4	0	-59	-150
80	120	3.1496	4.7244	0	-6	5	0	-79	-150
120	180	4.7244	7.0866	0	-7	7	0	-98	-197
180	250	7.0866	9.8425	0	-8.5	8	0	-118	-197
250	315	9.8425	12.4016	0	-10	10	0	-138	-197
315	400	12.4016	15.7480	0	-12	12	0	-157	-248

Metric

Tolerance values in micrometers

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-7	5	0	-40	-
2.5	10	0.0984	0.3937	0	-7	6	0	-120	-250
10	18	0.3937	0.7087	0	-7	7	0	-120	-250
18	30	0.7087	1.1811	0	-8	8	0	-120	-250
30	50	1.1811	1.9685	0	-10	10	0	-120	-250
50	80	1.9685	3.1496	0	-12	10	0	-150	-380
80	120	3.1496	4.7244	0	-15	13	0	-200	-380
120	180	4.7244	7.0866	0	-18	18	0	-250	-500
180	250	7.0866	9.8425	0	-22	20	0	-300	-500
250	315	9.8425	12.4016	0	-25	25	0	-350	-500
315	400	12.4016	15.7480	0	-30	30	0	-400	-630



# TECHNICAL INFORMATION




Table II B

Tolerance Class ABEC-3, RBEC-3  
(ISO Class 6)  
Outer Ring

English

Tolerance values in 0.0001 inch

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout (Kea)	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
2.5	6	0.0984	0.2362	0	-3	3	 Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-3	3			
18	30	0.7087	1.1811	0	-3	3.5			
30	50	1.1811	1.9685	0	-3.5	4			
50	80	1.9685	3.1496	0	-4.5	5			
80	120	3.1496	4.7244	0	-5	7			
120	150	4.7244	5.9055	0	-6	8			
150	180	5.9055	7.0866	0	-7	9			
180	250	7.0866	9.8425	0	-8	10			
250	315	9.8425	12.4016	0	-10	12			
315	400	12.4016	15.7480	0	-11	14			
400	500	15.7480	19.6850	0	-13	16			
500	630	19.6850	24.8031	0	-15	20			
630	800	24.8031	31.4961	0	-18	24			
800	1000	31.4961	39.3701	0	-24	30			




# TECHNICAL INFORMATION



Table II B (continued)

Tolerance Class ABEC-3, RBEC-3  
(ISO Class 6)  
Outer Ring

Metric Tolerance values in micrometers

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout (Kea)	Width Tolerance ( $\Delta C_s$ )			
mm		inch		high	low		max.	all	single bearing	paired bearings
over	incl.	over	incl.			high		low	max.	high
2.5	6	0.0984	0.2362	0	-7	8	 Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing			
6	18	0.2362	0.7087	0	-7	8				
18	30	0.7087	1.1811	0	-8	9				
30	50	1.1811	1.9685	0	-9	10				
50	80	1.9685	3.1496	0	-11	13				
80	120	3.1496	4.7244	0	-13	18				
120	150	4.7244	5.9055	0	-15	20				
150	180	5.9055	7.0866	0	-18	23				
180	250	7.0866	9.8425	0	-20	25				
250	315	9.8425	12.4016	0	-25	30				
315	400	12.4016	15.7480	0	-28	35				
400	500	15.7480	19.6850	0	-33	40				
500	630	19.6850	24.8031	0	-38	50				
630	800	24.8031	31.4961	0	-45	60				
800	1000	31.4961	39.3701	0	-60	75				





# TECHNICAL INFORMATION



Table III A

## Tolerance Class ABEC-5, RBEC-5 (ISO Class 5) Inner Ring

English

Tolerance values in 0.0001 inch

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-2	1.5	0	-16	-98
2.5	10	0.0984	0.3937	0	-2	1.5	0	-16	-98
10	18	0.3937	0.7087	0	-2	1.5	0	-31	-98
18	30	0.7087	1.1811	0	-2.5	1.5	0	-47	-98
30	50	1.1811	1.9685	0	-3	2	0	-47	-98
50	80	1.9685	3.1496	0	-3.5	2	0	-59	-98
80	120	3.1496	4.7244	0	-4	2.5	0	-79	-150
120	180	4.7244	7.0866	0	-5	3	0	-98	-150
180	250	7.0866	9.8425	0	-6	4	0	-118	-197
250	315	9.8425	12.4016	0	-7	5	0	-138	-197
315	400	12.4016	15.7480	0	-9	6	0	-157	-248

Metric

Tolerance values in micrometers

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			max.			
0.6	2.5	0.0236	0.0984	0	-5	4	0	-40	-250
2.5	10	0.0984	0.3937	0	-5	4	0	-40	-250
10	18	0.3937	0.7087	0	-5	4	0	-80	-250
18	30	0.7087	1.1811	0	-6	4	0	-120	-250
30	50	1.1811	1.9685	0	-8	5	0	-120	-250
50	80	1.9685	3.1496	0	-9	5	0	-150	-250
80	120	3.1496	4.7244	0	-10	6	0	-200	-380
120	180	4.7244	7.0866	0	-13	8	0	-250	-380
180	250	7.0866	9.8425	0	-15	10	0	-300	-500
250	315	9.8425	12.4016	0	-18	13	0	-350	-500
315	400	12.4016	15.7480	0	-23	15	0	-400	-630



# TECHNICAL INFORMATION



Table III B

Tolerance Class ABEC-5, RBEC-5  
(ISO Class 5)  
Outer Ring

English

Tolerance values in 0.0001 inch



Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.			high		low	max.
2.5	6	0.0984	0.2362	0	-2	2	 <p>Identical to Width Tolerance (<math>\Delta BS</math>) of Inner Ring of the same Bearing</p>		
6	18	0.2362	0.7087	0	-2	2			
18	30	0.7087	1.1811	0	-2.5	2.5			
30	50	1.1811	1.9685	0	-3	3			
50	80	1.9685	3.1496	0	-3.5	3			
80	120	3.1496	4.7244	0	-4	4			
120	150	4.7244	5.9055	0	-4.5	4.5			
150	180	5.9055	7.0866	0	-5	5			
180	250	7.0866	9.8425	0	-6	6			
250	315	9.8425	12.4016	0	-7	7			
315	400	12.4016	15.7480	0	-8	8			
400	500	15.7480	19.6850	0	-9	9			
500	630	19.6850	24.8031	0	-11	10			
630	800	24.8031	31.4961	0	-14	12			

Table III B (continued)

Tolerance Class ABEC-5, RBEC-5  
(ISO Class 5)  
Outer Ring

Metric Tolerance values in micrometers

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
2.5	6	0.0984	0.2362	0	-5	5	 <p>Identical to Width Tolerance (<math>\Delta BS</math>) of Inner Ring of the same Bearing</p>		
6	18	0.2362	0.7087	0	-5	5			
18	30	0.7087	1.1811	0	-6	6			
30	50	1.1811	1.9685	0	-7	7			
50	80	1.9685	3.1496	0	-9	8			
80	120	3.1496	4.7244	0	-10	10			
120	150	4.7244	5.9055	0	-11	11			
150	180	5.9055	7.0866	0	-13	13			
180	250	7.0866	9.8425	0	-15	15			
250	315	9.8425	12.4016	0	-18	18			
315	400	12.4016	15.7480	0	-20	20			
400	500	15.7480	19.6850	0	-23	23			
500	630	19.6850	24.8031	0	-28	25			
630	800	24.8031	31.4961	0	-35	30			



# TECHNICAL INFORMATION



Table IV A

Tolerance Class ABEC-7, RBEC-7  
(ISO Class 4)  
Inner Ring

English

Tolerance values in 0.0001 inch

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
0.6	2.5	0.0236	0.0984	0	-1.5	1	0	-16	-98
2.5	10	0.0984	0.3937	0	-1.5	1	0	-16	-98
10	18	0.3937	0.7087	0	-1.5	1	0	-31	-98
18	30	0.7087	1.1811	0	-2	1	0	-47	-98
30	50	1.1811	1.9685	0	-2.5	1.5	0	-47	-98
50	80	1.9685	3.1496	0	-3	1.5	0	-59	-98
80	120	3.1496	4.7244	0	-3	2	0	-79	-150
120	180	4.7244	7.0866	0	-4	2.5	0	-98	-150
180	250	7.0866	9.8425	0	-4.5	3	0	-118	-197

Metric

Tolerance values in micrometers

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.					high	low
0.6	2.5	0.0236	0.0984	0	-4	2.5	0	-40	-250
2.5	10	0.0984	0.3937	0	-4	2.5	0	-40	-250
10	18	0.3937	0.7087	0	-4	2.5	0	-80	-250
18	30	0.7087	1.1811	0	-5	3	0	-120	-250
30	50	1.1811	1.9685	0	-6	4	0	-120	-250
50	80	1.9685	3.1496	0	-7	4	0	-150	-250
80	120	3.1496	4.7244	0	-8	5	0	-200	-380
120	180	4.7244	7.0866	0	-10	6	0	-250	-380
180	250	7.0866	9.8425	0	-12	8	0	-300	-500



# TECHNICAL INFORMATION



Table IV B

Tolerance Class ABEC-7, RBEC-7  
(ISO Class 4)  
Outer Ring

English

Tolerance values in 0.0001 inch

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.			high low			
2.5	6	0.0984	0.2362	0	-1.5	1	Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-1.5	1			
18	30	0.7087	1.1811	0	-2	1.5			
30	50	1.1811	1.9685	0	-2.5	2			
50	80	1.9685	3.1496	0	-3	2			
80	120	3.1496	4.7244	0	-3	2.5			
120	150	4.7244	5.9055	0	-3.5	3			
150	180	5.9055	7.0866	0	-4	3			
180	250	7.0866	9.8425	0	-4.5	4			
250	315	9.8425	12.4016	0	-5	4.5			
315	400	12.4016	15.7480	0	-6	5			

Metric

Tolerance values in micrometers

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		max.	all	single bearing
over	incl.	over	incl.			high low			
2.5	6	0.0984	0.2362	0	-4	3	Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-4	3			
18	30	0.7087	1.1811	0	-5	4			
30	50	1.1811	1.9685	0	-6	5			
50	80	1.9685	3.1496	0	-7	5			
80	120	3.1496	4.7244	0	-8	6			
120	150	4.7244	5.9055	0	-9	7			
150	180	5.9055	7.0866	0	-10	8			
180	250	7.0866	9.8425	0	-11	10			
250	315	9.8425	12.4016	0	-13	11			
315	400	12.4016	15.7480	0	-15	13			



# TECHNICAL INFORMATION



Table V A

Tolerance Class ABEC-9, RBEC-9  
(ISO Class 2)  
Inner Ring

English

Tolerance values in 0.0001 inch

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch					all	single bearing	paired bearings
over	incl.	over	incl.	high	low	max.	high	low	
0.6	2.5	0.0236	0.0984	0	-1	0.5	0	-16	-98
2.5	10	0.0984	0.3937	0	-1	0.5	0	-16	-98
10	18	0.3937	0.7087	0	-1	0.5	0	-31	-98
18	30	0.7087	1.1811	0	-1	1	0	-47	-98
30	50	1.1811	1.9685	0	-1	1	0	-47	-98
50	80	1.9685	3.1496	0	-1.5	1	0	-59	-98
80	120	3.1496	4.7244	0	-2	1	0	-79	-150
120	150	4.7244	5.9055	0	-3	1	0	-98	-150
150	180	5.9055	7.0866	0	-3	2	0	-98	-150
180	250	7.0866	9.8425	0	-3	2	0	-138	-197

Metric

Tolerance values in micrometers

Bore Diameter (d)				Bore Tolerance ( $\Delta d_{mp}$ )		Radial Runout ( $K_{ia}$ )	Width Tolerance ( $\Delta B_S$ )		
mm		inch					all	single bearing	paired bearings
over	incl.	over	incl.	high	low	max.	high	low	
0.6	2.5	0.0236	0.0984	0	-2.5	1.5	0	-40	-250
2.5	10	0.0984	0.3937	0	-2.5	1.5	0	-40	-250
10	18	0.3937	0.7087	0	-2.5	1.5	0	-80	-250
18	30	0.7087	1.1811	0	-2.5	2.5	0	-120	-250
30	50	1.1811	1.9685	0	-2.5	2.5	0	-120	-250
50	80	1.9685	3.1496	0	-4	2.5	0	-150	-250
80	120	3.1496	4.7244	0	-5	2.5	0	-200	-380
120	150	4.7244	5.9055	0	-7	2.5	0	-250	-380
150	180	5.9055	7.0866	0	-7	5	0	-250	-380
180	250	7.0866	9.8425	0	-8	5	0	-300	-500



# TECHNICAL INFORMATION



Table V B

Tolerance Class ABEC-9, RBEC-9  
(ISO Class 2)  
Outer Ring

English

Tolerance values in 0.0001 inch

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			high			
2.5	6	0.0984	0.2362	0	-1	0.5	Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-1	0.5			
18	30	0.7087	1.1811	0	-1.5	1			
30	50	1.1811	1.9685	0	-1.5	1			
50	80	1.9685	3.1496	0	-1.5	1.5			
80	120	3.1496	4.7244	0	-2	2			
120	150	4.7244	5.9055	0	-2	2			
150	180	5.9055	7.0866	0	-3	2			
180	250	7.0866	9.8425	0	-3	3			
250	315	9.8425	12.4016	0	-3	3			
315	400	12.4016	15.7480	0	-4	3			

Metric

Tolerance values in micrometers

Outer Diameter (D)				Outer Dia. Tolerance ( $\Delta D_{mp}$ )		Radial Runout ( $K_{\alpha}$ )	Width Tolerance ( $\Delta C_s$ )		
mm		inch		high	low		all	single bearing	paired bearings
over	incl.	over	incl.			high			
2.5	6	0.0984	0.2362	0	-2.5	1.5	Identical to Width Tolerance ( $\Delta BS$ ) of Inner Ring of the same Bearing		
6	18	0.2362	0.7087	0	-2.5	1.5			
18	30	0.7087	1.1811	0	-4	2.5			
30	50	1.1811	1.9685	0	-4	2.5			
50	80	1.9685	3.1496	0	-4	4			
80	120	3.1496	4.7244	0	-5	5			
120	150	4.7244	5.9055	0	-5	5			
150	180	5.9055	7.0866	0	-7	5			
180	250	7.0866	9.8425	0	-8	7			
250	315	9.8425	12.4016	0	-8	7			
315	400	12.4016	15.7480	0	-10	8			