

PO and ABEC 1 Precision Tolerances

In Accordance with ISO 492 and ABMA 20 Standards



Inner Ri	ng Toler	ance -	Metric	:			
Nominal ID [mm]		2.5					80
Nominal ID [mm]	Including	10	18	30	50	80	120
Δ _{dmp} [μm]	Max	0	0	0	0	0	0
Average ID tolerance	Min	-8.0	-8.0	-10.0	-12.0	-15.0	-20.0
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max						
Single ID tolerance	Min						
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	10.0	10.0	13.0	15.0	19.0	25.0
V _{dp max} (Bearing Series 60) [μm] Difference between largest and smallest ID	Max	8.0	8.0	10.0	12.0	19.0	25.0
V _{dp max} (Bearing Series 62) [µm] Difference between largest and smallest ID	Max	6.0	6.0	8.0	9.0	11.0	15.0
V _{dmp max} [µm] Difference between largest average ID and smallest average ID in different planes	Max	6.0	6.0	8.0	9.0	11.0	15.0
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	10.0	10.0	13.0	15.0	20.0	25.0
S _{d max} [µm] Inner ring face runout	Max						
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max						
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	0
Single inner ring width tolerance	Min	-120	-120	-120	-120	-150	-200
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	0
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-380	-380
V _{BS max} [µm]	Max	15.0	20.0	20.0	20.0	25.0	25.0
Difference between largest and smallest width	IVIAX	13.0	20.0	20.0	20.0	25.0	23.0
Laure D'a	T. 1						

Oute	r Ring T	oleran	ce - Me	etric						
Naminal OD [mm]	Above	6	18	30	50	80	120	150		
Nominal OD [mm]	Including	18	30	50	80	120	150	180		
Δ _{Dmp} [μm]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-8.0	-9.0	-11.0	-13.0	-15.0	-18.0	-25.0		
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max									
Single OD tolerance	Min									
V _{Dp max} (Bearing Series 618 & 619) [μm]	Max	10.0	12.0	14.0	16.0	19.0	23.0	31.0		
Difference between largest and smallest OD	IVIAA	10.0	12.0	14.0	10.0	19.0	25.0	31.0		
V _{Dp max} (Bearing Series 60) [μm]	Max	x 8.0 9.0 11.0 13.0 19.0 23.0 31.0								
Difference between largest and smallest OD	IVIOX	0.0	0.0	11.0	10.0	10.0	20.0	01.0		
V _{Dp max} (Bearing Series 62) [μm]	Max	6.0	7.0	8.0	10.0	11.0	14.0	19.0		
Difference between largest and smallest OD	- max	0.0		0.0	10.0			10.0		
V _{Dmp max} [µm]										
Difference between largest average OD and	Max	6.0	7.0	8.0	10.0	11.0	14.0	19.0		
smallest average OD in different planes Kea max [µm]										
Assembled bearing outer ring radial runout	Max	15.0	15.0	20.0	25.0	35.0	40.0	45.0		
S _{D max} [µm]										
Outer ring face runout	Max									
Sea max [µm]										
Assembled bearing outer ring axial runout	Max									
Δ _{CS} Single Bearing [μm]	Max			1	1	1	1			
Single outer ring width tolerance	Min	Ider	ntical to th	$e \Delta_{BS}$ of the	he inner r	ing of the	same bea	aring		
Δ _{CS} Bearing Pair [μm]	Max									
Outer ring pair width tolerance	Min Identical to the Δ_{BS} of the inner ring of the same bearing									
V _{CS max} [µm]										
Difference between largest and smallest width	Max	Iden	tical to the	e VBS of t	the inner i	ring of the	same be	aring		

Inner Ring Tolerance - Imperial										
Nominal ID [inch]	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496			
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244			
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	0			
Average ID tolerance	Min	-3.1	-3.1	-3.9	-4.7	-5.9	-7.9			
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max									
Single ID tolerance	Min									
V _{dp max} (Bearing Series 618 & 619) [0.0001"]	Max	3.9	3.9	5.1	5.9	7.5	9.8			
Difference between largest and smallest ID	IVIAX	3.9	3.9	3.1	5.9	7.5	9.0			
V _{dp max} (Bearing Series 60) [0.0001"]	Max	3.1	3.1	3.9	4.7	7.5	9.8			
Difference between largest and smallest ID	IVIAX	3.1	3.1	3.9	4.7	7.5	9.0			
V _{dp max} (Bearing Series 62) [0.0001"]	Max	2.4	2.4	3.1	3.5	4.3	5.9			
Difference between largest and smallest ID	IVIAX	2.4	2.4	3.1	3.5	4.3	5.9			
V _{dmp max} [0.0001"]										
Difference between largest average ID and	Max	2.4	2.4	3.1	3.5	4.3	5.9			
smallest average ID in different planes										
K _{ia max} [0.0001"]	Max	3.9	3.9	5.1	5.9	7.9	9.8			
Assembled bearing inner ring radial runout										
S _{d max} [0.0001"]	Max									
Inner ring face runout	- max									
S _{ia max} [0.0001"]	Max									
Assembled bearing inner ring axial runout	IVIGA									
Δ _{BS} Single Bearing [0.0001"]	Max		0	0	0	0	0			
Single inner ring width tolerance	Min	-47.2	-47.2	-47.2	-47.2	-59.1	-78.7			
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	0			
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-149.6	-149.6			
V _{BS max} [0.0001"]	Max	5.9	7.9	7.9	7.9	9.8	9.8			
Difference between largest and smallest width	IVIAX	0.9	1.5	1.9	1.5	0.0	3.0			

Outer	Ring To	oleranc	e - Imp	erial						
Name of OD the ski	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-3.1	-3.5	-4.3	-5.1	-5.9	-7.1	-9.8		
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max									
Single OD tolerance	Min									
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	3.9 4.7 5.5 6.3 7.5 9.1 12.2								
Difference between largest and smallest OD	IVIAX	3.9 4.7 5.5 6.3 7.5 9.1 12.2								
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	3.1 3.5 4.3 5.1 7.5 9.1 12.2								
Difference between largest and smallest OD	IVIGA	0.1	3.3	7.5	5.1	7.5	3.1	12.2		
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	2.4	2.8	3.1	3.9	4.3	5.5	7.5		
Difference between largest and smallest OD	IVIGA	2.7	2.0	3.1	5.5	4.5	0.5	7.5		
V _{Dmp max} [0.0001"]										
Difference between largest average OD and	Max	2.4	2.8	3.1	3.9	4.3	5.5	7.5		
smallest average OD in different planes										
Kea max [0.0001"]	Max	5.9	5.9	7.9	9.8	13.8	15.7	17.7		
Assembled bearing outer ring radial runout										
S _{D max} [0.0001"]	Max									
Outer ring face runout										
Sea max [0.0001"]	Max									
Assembled bearing outer ring axial runout										
Δ _{CS} Single Bearing [0.0001"]	Max	Ider	ntical to th	e Δ _{BS} of th	ne inner ri	ng of the	same bea	ring		
Single outer ring width tolerance		Min								
Δcs Bearing Pair [0.0001"]		Max Identical to the Δ_{BS} of the inner ring of the same bearing								
Outer ring pair width tolerance	Min Min									
V _{CS max} [0.0001"]	Max	Iden	tical to the	e VBS of t	he inner r	ing of the	same be	aring		
Difference between largest and smallest width						J				



P6 and ABEC 3 Precision Tolerances

In Accordance with ISO 492 and ABMA 20 Standards



Inner Ri	ng Toler	ance -	Metric	:			
Nominal ID [mm]		2.5					
נווווון ט נווווון	Including	10	18	30	50	80	120
Δ _{dmp} [μm]	Max	0	0	0	0	0	0
Average ID tolerance	Min	-7.0	-7.0	-8.0	-10.0	-12.0	-15.0
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max						
Single ID tolerance	Min						
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	9.0	9.0	10.0	13.0	15.0	19.0
V _{dp max} (Bearing Series 60) [μm] Difference between largest and smallest ID	Max	7.0	7.0	8.0	10.0	15.0	19.0
V _{dp max} (Bearing Series 62) [μm] Difference between largest and smallest ID	Max	5.0	5.0	6.0	8.0	9.0	11.0
V _{dmp max} [µm] Difference between largest average ID and smallest average ID in different planes	Max	5.0	5.0	6.0	8.0	9.0	11.0
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	6.0	7.0	8.0	10.0	10.0	13.0
S _{d max} [µm] Inner ring face runout	Max						
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max						
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	0
Single inner ring width tolerance	Min	-120	-120	-120	-120	-150	-200
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	0
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-380	-380
V _{BS max} [µm] Difference between largest and smallest width	Max	15.0	20.0	20.0	20.0	25.0	25.0

Outer Ring Tolerance - Metric											
Nominal OD [mm]	Above	6	18	30	50	80	120	150			
Nominal OD [mm]	Including	18	30	50	80	120	150	180			
Δ _{Dmp} [μm]	Max	0	0	0	0	0	0	0			
Average OD tolerance	Min	-7.0	-8.0	-9.0	-11.0	-13.0	-15.0	-18.0			
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max										
Single OD tolerance	Min	n									
V _{Dp max} (Bearing Series 618 & 619) [μm]	Max	Max 9.0 10.0 11.0 14.0 16.0 19.0 23.0									
Difference between largest and smallest OD	- IIIGA	max 0.0 10.0 1.10 1.10 10.0 20.0									
V _{Dp max} (Bearing Series 60) [μm]	Max	Max 7.0 8.0 9.0 11.0 16.0 19.0 23.0									
Difference between largest and smallest OD											
V _{Dp max} (Bearing Series 62) [μm]	Max	5.0	6.0	7.0	8.0	10.0	11.0	14.0			
Difference between largest and smallest OD				-							
V _{Dmp max} [μm]	Max	5.0	6.0	7.0	8.0	10.0	11.0	14.0			
Difference between largest average OD and smallest average OD in different planes	IVIAX	5.0	0.0	7.0	0.0	10.0	11.0	14.0			
K _{ea max} [µm]											
Assembled bearing outer ring radial runout	Max	8.0	9.0	10.0	13.0	18.0	20.0	23.0			
S _{D max} [µm]											
Outer ring face runout	Max										
S _{ea max} [µm]											
Assembled bearing outer ring axial runout	Max										
Δ _{CS} Single Bearing [μm]	Max										
Single outer ring width tolerance	Min	Identical to the App of the inner ring of the same hearing									
Δ _{CS} Bearing Pair [μm]	Max										
Outer ring pair width tolerance	Identical to the Δ_{BS} of the inner ring of the same bearing										
V _{CS max} [µm]	Max Identical to the VBS of the inner ring of the same bearing										
Difference between largest and smallest width	IVIAX	iden	licai lo liie	# VDS 01 1	ne inner i	ing of the	same be	aring			

Inner Ring Tolerance - Imperial											
Manager I ID Strate	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496				
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244				
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	0				
Average ID tolerance	Min	-2.8	-2.8	-3.1	-3.9	-4.7	-5.9				
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max										
Single ID tolerance	Min										
V _{dp max} (Bearing Series 618 & 619) [0.0001"] Difference between largest and smallest ID	Max	3.5	3.5	3.9	5.1	5.9	7.5				
V _{dp max} (Bearing Series 60) [0.0001"] Difference between largest and smallest ID	Max	2.8	2.8	3.1	3.9	5.9	7.5				
V _{dp max} (Bearing Series 62) [0.0001"] Difference between largest and smallest ID	Max	2.0	2.0	2.4	3.1	3.5	4.3				
V _{dmp max} [0.0001"] Difference between largest average ID and smallest average ID in different planes	Max	2.0	2.0	2.4	3.1	3.5	4.3				
K _{ia max} [0.0001"] Assembled bearing inner ring radial runout	Max	2.4	2.8	3.1	3.9	3.9	5.1				
S _{d max} [0.0001"] Inner ring face runout	Max										
S _{ia max} [0.0001"] Assembled bearing inner ring axial runout	Max										
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0	0				
Single inner ring width tolerance	Min	-47.2	-47.2	-47.2	-47.2	-59.1	-78.7				
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	0				
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-149.6	-149.6				
V _{BS max} [0.0001"] Difference between largest and smallest width	Max	5.9	7.9	7.9	7.9	9.8	9.8				

Outer Ring Tolerance - Imperial											
Name of OD Backs	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055			
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866			
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0	0	0			
Average OD tolerance	Min	-2.8	-3.1	-3.5	-4.3	-5.1	-5.9	-7.1			
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max										
Single OD tolerance	Min										
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	3.5	3.9	4.3	5.5	6.3	7.5	9.1			
Difference between largest and smallest OD	IVIGA	0.0	5.5	4.5	0.0	0.5	7.5	3.1			
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	2.8 3.1 3.5 4.3 6.3 7.5 9.1									
Difference between largest and smallest OD	IVIUX		0.1	0.0	7.0	0.0	7.0	0.1			
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	2.0	2.4	2.8	3.1	3.9	4.3	5.5			
Difference between largest and smallest OD					0	0.0	1.0	0.0			
V _{Dmp max} [0.0001"]											
Difference between largest average OD and smallest average OD in different planes	Max	2.0	2.4	2.8	3.1	3.9	4.3	5.5			
K _{ea max} [0.0001"]											
Assembled bearing outer ring radial runout	Max	3.1	3.5	3.9	5.1	7.1	7.9	9.1			
S _{D max} [0.0001"]											
Outer ring face runout	Max										
Sea max [0.0001"]											
Assembled bearing outer ring axial runout	Max										
Δ _{CS} Single Bearing [0.0001"]	Max										
Single outer ring width tolerance	Min	Identical to the Λ _{PS} of the inner ring of the same hearing									
Δ _{CS} Bearing Pair [0.0001"]	Max	Max									
Outer ring pair width tolerance	Min	Identical to the Ass of the inner ring of the same bearing									
V _{CS max} [0.0001"]											
Difference between largest and smallest width	Max	Iden	tical to the	VBS of t	ne inner r	ing of the	same bea	aring			



P5 and ABEC 5 Precision Tolerances

In Accordance with ISO 492 and ABMA 20 Standards



Inner Ri	ing Toler	ance -	Metric	:			
Nominal ID [mm]		2.5					80
Nominal ID [mm]	Including	10	18	30	50	80	120
Δ _{dmp} [μm]	Max	0	0	0	0	0	0
Average ID tolerance	Min	-5.0	-5.0	-6.0	-8.0	-9.0	-10.0
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max						
Single ID tolerance	Min						
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	5.0	5.0	6.0	8.0	9.0	10.0
V _{dp max} (Bearing Series 60) [µm] Difference between largest and smallest ID	Max	4.0	4.0	5.0	6.0	7.0	8.0
V _{dp max} (Bearing Series 62) [µm] Difference between largest and smallest ID	Max	4.0	4.0	5.0	6.0	7.0	8.0
V _{dmp max} [µm] Difference between largest average ID and smallest average ID in different planes	Max	3.0	3.0	3.0	4.0	5.0	5.0
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	4.0	4.0	4.0	5.0	5.0	6.0
S _{d max} [µm] Inner ring face runout	Max	7.0	7.0	8.0	8.0	9.0	10.0
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max	7.0	7.0	8.0	8.0	9.0	10.0
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	0
Single inner ring width tolerance	Min	-40	-80	-120	-120	-150	-200
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	0
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-250	-380
V _{BS max} [μm] Difference between largest and smallest width	Max	5.0	5.0	5.0	5.0	6.0	7.0
Inner Pir	a Tolor:	nco -	Impori:	s I			

Oute	r Ring T	oleran	ce - Me	etric					
Naminal OD [mm]							120		
Nominal OD [mm]	Including	18	30	50	80	120	150	180	
Δ _{Dmp} [μm]	Max	0	0	0	0	0	0	0	
Average OD tolerance	Min	-5.0	-6.0	-7.0	-9.0	-10.0	-11.0	-13.0	
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max								
Single OD tolerance	Min								
V _{Dp max} (Bearing Series 618 & 619) [μm]	Max	5.0	6.0	7.0	9.0	10.0	11.0	13.0	
Difference between largest and smallest OD	IVIAA	3.0	0.0	7.0	9.0	10.0	11.0	13.0	
V _{Dp max} (Bearing Series 60) [μm]	Max	4.0	5.0	5.0	7.0	8.0	8.0	10.0	
Difference between largest and smallest OD	IVIAA	4.0	3.0	3.0	7.0	0.0	0.0	10.0	
V _{Dp max} (Bearing Series 62) [μm]	Max	4.0	5.0	5.0	7.0	8.0	8.0	10.0	
Difference between largest and smallest OD	IVIGA	4.0	3.0	3.0	7.0	0.0	0.0	10.0	
V _{Dmp max} [μm]									
Difference between largest average OD and	Max	3.0	3.0	4.0	5.0	5.0	6.0	7.0	
smallest average OD in different planes									
Keamax [µm]	Max	5.0	6.0	7.0	8.0	10.0	11.0	13.0	
Assembled bearing outer ring radial runout									
S _{D max} [µm]	Max	8.0	8.0	8.0	8.0	9.0	10.0	10.0	
Outer ring face runout									
S _{ea max} [µm] Assembled bearing outer ring axial runout	Max	8.0	8.0	8.0	10.0	11.0	13.0	14.0	
	Max								
Δ _{CS} Single Bearing [μm] Single outer ring width tolerance	Min	Identical to the Ass of the inner ring of the same hearing							
Δ _{CS} Bearing Pair [μm]	Max	***							
Outer ring pair width tolerance	Min	Identical to the $\Lambda_{\rm BS}$ of the inner ring of the same hearing							
V _{CS max} [µm]	IVIIII								
Difference between largest and smallest width	Max	5.0	5.0	5.0	6.0	8.0	8.0	8.0	
Difference between largest and smallest width									

Inner Ring Tolerance - Imperial											
Name and ID Strate	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496				
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244				
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	0				
Average ID tolerance	Min	-2.0	-2.0	-2.4	-3.1	-3.5	-3.9				
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max										
Single ID tolerance	Min										
V _{dp max} (Bearing Series 618 & 619) [0.0001"]	Max	2.0	2.0	2.4	3.1	3.5	3.9				
Difference between largest and smallest ID		-									
V _{dp max} (Bearing Series 60) [0.0001"]	Max	1.6	1.6	2.0	2.4	2.8	3.1				
Difference between largest and smallest ID											
V _{dp max} (Bearing Series 62) [0.0001"]	Max	1.6	1.6	2.0	2.4	2.8	3.1				
Difference between largest and smallest ID					1	1					
V _{dmp max} [0.0001"]	Max	1.2	1.2	1.2	1.6	2.0	2.0				
Difference between largest average ID and smallest average ID in different planes	IVIAX	1.2	1.2	1.2	1.0	2.0	2.0				
K _{ia max} [0.0001"]		4.0	4.0	4.0							
Assembled bearing inner ring radial runout	Max	1.6	1.6	1.6	2.0	2.0	2.4				
S _{d max} [0.0001"]	Max	2.8	2.8	3.1	3.1	3.5	3.9				
Inner ring face runout	IVIAX	2.0	2.0	3.1	3.1	3.5	3.9				
S _{ia max} [0.0001"]	Max	2.8	2.8	3.1	3.1	3.5	3.9				
Assembled bearing inner ring axial runout	IVIAX	2.0	2.0	3.1	3.1	3.5	3.9				
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0	0				
Single inner ring width tolerance	Min	-15.7	-31.5	-47.2	-47.2	-59.1	-78.7				
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	0				
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-98.4	-149.6				
V _{BS max} [0.0001"]	Max	2.0	2.0	2.0	2.0	2.4	2.8				
Difference between largest and smallest width	IVIGA	0	2.0	2.0	2.0	2.7	2.0				

Outer	Ring To	oleranc	e - Imp	erial						
Newsia at OD Back	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-2.0	-2.4	-2.8	-3.5	-3.9	-4.3	-5.1		
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max									
Single OD tolerance	Min									
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	2.0 2.4 2.8 3.5 3.9 4.3 5.1								
Difference between largest and smallest OD	IVIAX	2.0	2.4	2.0	3.5	3.9	4.3	5.1		
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	1.6	2.0	2.0	2.8	3.1	3.1	3.9		
Difference between largest and smallest OD	IVIAX	1.0	2.0	2.0	2.0	3.1	3.1	3.9		
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	1.6	2.0	2.0	2.8	3.1	3.1	3.9		
Difference between largest and smallest OD	IVIAX	1.0	2.0	2.0	2.0	3.1	3.1	3.9		
V _{Dmp max} [0.0001"]										
Difference between largest average OD and	Max	1.2	1.2	1.6	2.0	2.0	2.4	2.8		
smallest average OD in different planes										
K _{ea max} [0.0001"]	Max	2.0	2.4	2.8	3.1	3.9	4.3	5.1		
Assembled bearing outer ring radial runout										
S _{D max} [0.0001"]	Max	3.1	3.1	3.1	3.1	3.5	3.9	3.9		
Outer ring face runout				• • • • • • • • • • • • • • • • • • • •						
S _{ea max} [0.0001"]	Max	3.1	3.1	3.1	3.9	4.3	5.1	5.5		
Assembled bearing outer ring axial runout	IVIUX	0.1	0.1	0.1	0.0	4.0	0.1	0.0		
Δ _{CS} Single Bearing [0.0001"]	Max	lder	ntical to th	e Λρο of th	ne inner ri	na of the	same hea	ring		
Single outer ring width tolerance	Min Identical to the Δ _{BS} of the inner ring of the same bearing									
Δ _{CS} Bearing Pair [0.0001"]	Max Identical to the Ass of the inner ring of the same hearing									
Outer ring pair width tolerance	Min Identical to the Δ _{BS} of the inner ring of the same bearing									
V _{CS max} [0.0001"]	Max	2.0	2.0	2.0	2.4	3.1	3.1	3.1		
Difference between largest and smallest width	IVIAA	2.0	2.0	2.0	2.4	0.1	5.1	5.1		



P4 and ABEC 7 Precision Tolerances

In Accordance with ISO 492 and ABMA 20 Standards



Inner Ring Tolerance - Metric										
Nominal ID [mm]		2.5					80			
Nominal ID [mm]	Including	10	18	30	50	80	120			
Δ _{dmp} [μm]	Max	0	0	0	0	0	0			
Average ID tolerance	Min	-4.0	-4.0	-5.0	-6.0	-7.0	-8.0			
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	0			
Single ID tolerance	Min	-4.0	-4.0	-5.0	-6.0	-7.0	-8.0			
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	4.0	4.0	5.0	6.0	7.0	8.0			
V _{dp max} (Bearing Series 60) [µm] Difference between largest and smallest ID	Max	3.0	3.0	4.0	5.0	5.0	6.0			
V _{dp max} (Bearing Series 62) [μm] Difference between largest and smallest ID	Max	3.0	3.0	4.0	5.0	5.0	6.0			
V _{dmp max} [µm] Difference between largest average ID and smallest average ID in different planes	Max	2.0	2.0	2.5	3.0	3.5	4.0			
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	2.5	2.5	3.0	4.0	4.0	5.0			
S _{d max} [µm] Inner ring face runout	Max	3.0	3.0	4.0	4.0	5.0	5.0			
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max	3.0	3.0	4.0	4.0	5.0	5.0			
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	0			
Single inner ring width tolerance	Min	-40	-80	-120	-120	-150	-200			
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	0			
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-250	-380			
V _{BS max} [µm] Difference between largest and smallest width	Max	2.5	2.5	2.5	3.0	4.0	4.0			

Oute	r Ring T	oleran	ce - Me	etric						
Nominal OD [mm]							120			
Nominal OD [mm]	Including	18	30	50	80	120	150	180		
Δ _{Dmp} [μm]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0		
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	0	0		
Single OD tolerance	Min	-4.0	-5.0	-6.0	-7.0	-8.0	-9.0	-10.0		
V _{Dp max} (Bearing Series 618 & 619) [μm]	Max	4.0	5.0	6.0	7.0	8.0	9.0	10.0		
Difference between largest and smallest OD	IVIAA	4.0	3.0	0.0	7.0	0.0	9.0	10.0		
V _{Dp max} (Bearing Series 60) [μm]	Max	3.0	4.0	5.0	5.0	6.0	7.0	8.0		
Difference between largest and smallest OD	IVIGA	5.0	4.0	3.0	3.0	0.0	7.0	0.0		
V _{Dp max} (Bearing Series 62) [μm]	Max	3.0	4.0	5.0	5.0	6.0	7.0	8.0		
Difference between largest and smallest OD	IVIOX	0.0	7.0	0.0	0.0	0.0	7.0	0.0		
V _{Dmp max} [µm]										
Difference between largest average OD and	Max	2.0	2.5	3.0	3.5	4.0	5.0	5.0		
smallest average OD in different planes										
K _{ea max} [µm] Assembled bearing outer ring radial runout	Max	3.0	4.0	5.0	5.0	6.0	7.0	8.0		
S _{D max} [µm] Outer ring face runout	Max	4.0	4.0	4.0	4.0	5.0	5.0	5.0		
S _{ea max} [µm] Assembled bearing outer ring axial runout	Max	5.0	5.0	5.0	5.0	6.0	7.0	8.0		
Δ _{CS} Single Bearing [μm]	Max									
Single outer ring width tolerance	Min	Identical to the $\Lambda_{\rm pc}$ of the inner ring of the same hearing								
Δ _{CS} Bearing Pair [μm]	Max									
Outer ring pair width tolerance		Min Identical to the Δ _{BS} of the inner ring of the same bearing								
V _{CS max} [µm]	IVIIII	William								
	Max	2.5	2.5	2.5	3.0	4.0	5.0	5.0		
Difference between largest and smallest width										

Inner Rir	ng Tolera	ance -	Imperia	al			
Manager I ID Strate	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	0
Average ID tolerance	Min	-1.6	-1.6	-2.0	-2.4	-2.8	-3.1
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0	0
Single ID tolerance	Min	-1.6	-1.6	-2.0	-2.4	-2.8	-3.1
V _{dp max} (Bearing Series 618 & 619) [0.0001"] Difference between largest and smallest ID	Max	1.6	1.6	2.0	2.4	2.8	3.1
V _{dp max} (Bearing Series 60) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.6	2.0	2.0	2.4
V _{dp max} (Bearing Series 62) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.6	2.0	2.0	2.4
V _{dmp max} [0.0001"] Difference between largest average ID and smallest average ID in different planes	Max	0.8	0.8	1.0	1.2	1.4	1.6
K _{ia max} [0.0001"] Assembled bearing inner ring radial runout	Max	1.0	1.0	1.2	1.6	1.6	2.0
S _{d max} [0.0001"] Inner ring face runout	Max	1.2	1.2	1.6	1.6	2.0	2.0
S _{ia max} [0.0001"] Assembled bearing inner ring axial runout	Max	1.2	1.2	1.6	1.6	2.0	2.0
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0	0
Single inner ring width tolerance	Min	-15.7	-31.5	-47.2	-47.2	-59.1	-78.7
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	0
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-98.4	-149.6
V _{BS max} [0.0001"] Difference between largest and smallest width	Max	1.0	1.0	1.0	1.2	1.6	1.6

Outer	Ring To	leranc	e - Imp	erial						
Name of OD Backs	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-1.6	-2.0	-2.4	-2.8	-3.1	-3.5	-3.9		
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0	0	0		
Single OD tolerance	Min	-1.6	-2.0	-2.4	-2.8	-3.1	-3.5	-3.9		
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	1.6	2.0	2.4	2.8	3.1	3.5	3.9		
Difference between largest and smallest OD	WILL	1.0	2.0	2	2.0	0.1	0.0	0.0		
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	1.2	1.6	2.0	2.0	2.4	2.8	3.1		
Difference between largest and smallest OD	IVIUX	1.2	1.0	2.0		2.7		0.1		
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	1.2	1.6	2.0	2.0	2.4	2.8	3.1		
Difference between largest and smallest OD				2.0				0		
V _{Dmp max} [0.0001"]					١					
Difference between largest average OD and	Max	8.0	1.0	1.2	1.4	1.6	2.0	2.0		
smallest average OD in different planes										
Kea max [0.0001"]	Max	1.2	1.6	2.0	2.0	2.4	2.8	3.1		
Assembled bearing outer ring radial runout										
S _{D max} [0.0001"]	Max	1.6	1.6	1.6	1.6	2.0	2.0	2.0		
Outer ring face runout										
Sea max [0.0001"]	Max	2.0	2.0	2.0	2.0	2.4	2.8	3.1		
Assembled bearing outer ring axial runout										
Δ _{CS} Single Bearing [0.0001"]	Max	Identical to the $\Lambda_{\rm pc}$ of the inner ring of the same hearing								
Single outer ring width tolerance	Min	Ain as a same								
Δ _{CS} Bearing Pair [0.0001"]	Max	Identical to the Aps of the inner ring of the same bearing								
Outer ring pair width tolerance	Min	Min Min								
V _{CS max} [0.0001"]	Max	1.0	1.0	1.0	1.2	1.6	2.0	2.0		
Difference between largest and smallest width	max									



HG Precision Tolerances

GMN Special Class Above P4 and ABEC 7



Inner Ri	ing Toler	ance -	Metric	:			
Nominal ID [mm]	Above	2.5	10	18	30	50	80
Nominal ID [min]	Including		18	30		80	120
Δ _{dmp} [μm]	Max	0	0	0	0	0	
Average ID tolerance	Min	-3.0	-3.0	-3.0	-5.0	-5.0	
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	
Single ID tolerance	Min	-3.0	-3.0	-3.0	-5.0	-5.0	
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	5.0	5.0	
V _{dp max} (Bearing Series 60) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	5.0	5.0	
V _{dp max} (Bearing Series 62) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	5.0	5.0	
V _{dmp max} [μm] Difference between largest average ID and smallest average ID in different planes	Max	2.0	2.0	2.0	3.0	3.0	
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	2.0	2.0	2.0	2.0	3.0	
S _{d max} [µm] Inner ring face runout	Max	3.0	3.0	3.0	4.0	4.0	
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max	3.0	3.0	4.0	4.0	4.0	
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	
Single inner ring width tolerance	Min	-40	-80	-120	-120	-150	
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-250	
V _{BS max} [μm] Difference between largest and smallest width	Max	2.0	2.0	2.0	2.0	2.0	

Oute	er Ring T	oleran	ce - Me	tric				
Nominal OD [mm]	Above	6	18	30	50	80	120	150
Nominal OD [mm]	Including	18	30	50	80	120	150	180
Δ _{Dmp} [μm]	Max	0	0	0	0	0		
Average OD tolerance	Min	-3.0	-3.0	-3.0	-4.0	-4.0		
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0		
Single OD tolerance	Min	-3.0	-3.0	-3.0	-4.0	-4.0		
V _{Dp max} (Bearing Series 618 & 619) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dp max} (Bearing Series 60) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dp max} (Bearing Series 62) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dmp max} [µm] Difference between largest average OD and smallest average OD in different planes	Max	1.0	1.0	1.0	2.0	2.0		
K _{ea max} [μm] Assembled bearing outer ring radial runout	Max	2.0	2.0	2.0	3.0	3.0		
S _{D max} [µm] Outer ring face runout	Max	4.0	4.0	4.0	4.0	5.0		
S _{ea max} [μm] Assembled bearing outer ring axial runout	Max	5.0	5.0	5.0	5.0	5.0		
Δ _{CS} Single Bearing [μm] Single outer ring width tolerance	Max Min	Identical to the App of the inner ring of the same hearing						
Δ _{CS} Bearing Pair [μm] Outer ring pair width tolerance	Max Min	Identical to the App of the inner ring of the same hearing						
V _{CS max} [µm] Difference between largest and smallest width	Max	2.0	2.0	2.0	2.0	2.0		

Inner Rir	ng Tolera	ance -	Imperia	al			
Manager ID Such	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	
Average ID tolerance	Min	-1.2	-1.2	-1.2	-2.0	-2.0	
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0	
Single ID tolerance	Min	-1.2	-1.2	-1.2	-2.0	-2.0	
V _{dp max} (Bearing Series 618 & 619) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	2.0	2.0	
V _{dp max} (Bearing Series 60) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	2.0	2.0	
V _{dp max} (Bearing Series 62) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	2.0	2.0	
V _{dmp max} [0.0001"] Difference between largest average ID and smallest average ID in different planes	Max	0.8	0.8	0.8	1.2	1.2	
K _{ia max} [0.0001"] Assembled bearing inner ring radial runout	Max	0.8	0.8	0.8	0.8	1.2	
S _{d max} [0.0001"] Inner ring face runout	Max	1.2	1.2	1.2	1.6	1.6	
S _{ia max} [0.0001"] Assembled bearing inner ring axial runout	Max	1.2	1.2	1.6	1.6	1.6	
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0	
Single inner ring width tolerance	Min	-15.7	-31.5	-47.2	-47.2	-59.1	
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-98.4	
V _{BS max} [0.0001"] Difference between largest and smallest width	Max	0.8	0.8	0.8	0.8	0.8	

Outer	Ring To	leranc	e - Imp	erial						
Newsia at OD Back	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0				
Average OD tolerance	Min	-1.2	-1.2	-1.2	-1.6	-1.6				
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0				
Single OD tolerance	Min	-1.2	-1.2	-1.2	-1.6	-1.6				
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVICA	0.0	0.0	0.0	1.0	1.0				
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVIGA	0.0	0.0	0.0	1.0	1.0				
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVIOX	0.0	0.0	0.0	1.0	1.0				
V _{Dmp max} [0.0001"]										
Difference between largest average OD and	Max	0.4	0.4	0.4	0.8	0.8				
smallest average OD in different planes										
Kea max [0.0001"]	Max	0.8	0.8	0.8	1.2	1.2				
Assembled bearing outer ring radial runout										
S _{D max} [0.0001"]	Max	1.6	1.6	1.6	1.6	2.0				
Outer ring face runout										
S _{ea max} [0.0001"] Assembled bearing outer ring axial runout	Max	2.0	2.0	2.0	2.0	2.0				
Δ _{CS} Single Bearing [0.0001"]	Max									
Single outer ring width tolerance	Min	Identical to the App of the inner ring of the same hearing								
Δ _{CS} Bearing Pair [0.0001"]	Max									
Outer ring pair width tolerance	Min	Identical to the Λ _{RS} of the inner ring of the same bearing								
V _{CS max} [0.0001"]	IVIIII	"1								
Difference between largest and smallest width	Max	0.8	0.8	0.8	0.8	0.8				
Difference between largest and smallest width										



UP Precision Tolerances

GMN Special Class Above HG



Inner Ri	ng Toler	ance -	Metric	:			
Nominal ID [mm]	Above	2.5	10	18	30	50	80
Nominal ID [min]	Including	10	18	30	50	80	120
Δ _{dmp} [μm]	Max	0	0	0	0	0	
Average ID tolerance	Min	-3.0	-3.0	-3.0	-3.0	-4.0	
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	
Single ID tolerance	Min	-3.0	-3.0	-3.0	-3.0	-4.0	
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	3.0	4.0	
V _{dp max} (Bearing Series 60) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	3.0	4.0	
V _{dp max} (Bearing Series 62) [µm] Difference between largest and smallest ID	Max	3.0	3.0	3.0	3.0	4.0	
V _{dmp max} [μm] Difference between largest average ID and smallest average ID in different planes	Max	2.0	2.0	2.0	2.0	2.5	
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	1.5	1.5	1.5	2.0	2.0	
S _{d max} [µm] Inner ring face runout	Max	2.0	2.0	2.0	2.0	2.0	
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max	2.0	2.0	2.5	2.5	2.5	
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	
Single inner ring width tolerance	Min	-25	-80	-120	-120	-150	
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-250	
V _{BS max} [μm] Difference between largest and smallest width	Max	2.0	2.0	2.0	2.0	2.0	

Oute	er Ring T	oleran	ce - Me	tric				
Nominal OD [mm]	Above	6	18	30	50	80	120	150
Nominal OD [mm]	Including	18	30	50	80	120	150	180
Δ _{Dmp} [μm]	Max	0	0	0	0	0		
Average OD tolerance	Min	-3.0	-3.0	-3.0	-4.0	-4.0		
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0		
Single OD tolerance	Min	-3.0	-3.0	-3.0	-4.0	-4.0		
V _{Dp max} (Bearing Series 618 & 619) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dp max} (Bearing Series 60) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dp max} (Bearing Series 62) [μm] Difference between largest and smallest OD	Max	2.0	2.0	2.0	4.0	4.0		
V _{Dmp max} [µm] Difference between largest average OD and smallest average OD in different planes	Max	1.0	1.0	1.0	2.0	2.0		
K _{ea max} [μm] Assembled bearing outer ring radial runout	Max	2.0	2.0	2.0	3.0	3.0		
S _{D max} [µm] Outer ring face runout	Max	2.0	2.0	2.0	2.0	2.5		
S _{ea max} [μm] Assembled bearing outer ring axial runout	Max	2.0	2.0	2.0	2.0	2.5		
Δ _{CS} Single Bearing [μm] Single outer ring width tolerance	Max Min	Identical to the Ass of the inner ring of the same hearing						
Δ _{CS} Bearing Pair [μm] Outer ring pair width tolerance	Max Min	Identical to the App of the inner ring of the same hearing						
V _{CS max} [µm] Difference between largest and smallest width	Max	2.0	2.0	2.0	2.0	2.0		

Inner Ring Tolerance - Imperial										
Nominal ID [inch]	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496			
Nonlinario (indi)	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244			
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0				
Average ID tolerance	Min	-1.2	-1.2	-1.2	-1.2	-1.6				
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0				
Single ID tolerance	Min	-1.2	-1.2	-1.2	-1.2	-1.6				
V _{dp max} (Bearing Series 618 & 619) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	1.2	1.6				
V _{dp max} (Bearing Series 60) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	1.2	1.6				
V _{dp max} (Bearing Series 62) [0.0001"] Difference between largest and smallest ID	Max	1.2	1.2	1.2	1.2	1.6				
V _{dmp max} [0.0001"] Difference between largest average ID and smallest average ID in different planes	Max	0.8	0.8	0.8	0.8	1.0				
K _{ia max} [0.0001"] Assembled bearing inner ring radial runout	Max	0.6	0.6	0.6	0.8	0.8				
S _{d max} [0.0001"] Inner ring face runout	Max	0.8	0.8	0.8	0.8	0.8				
S _{ia max} [0.0001"] Assembled bearing inner ring axial runout	Max	0.8	0.8	1.0	1.0	1.0				
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0				
Single inner ring width tolerance	Min	-9.8	-31.5	-47.2	-47.2	-59.1				
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0				
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-98.4				
V _{BS max} [0.0001"] Difference between largest and smallest width	Max	0.8	0.8	0.8	0.8	0.8				

Outer	Ring To	leranc	e - Imp	erial						
Name of OD the ski	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
Nominal OD [Inch]	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0				
Average OD tolerance	Min	-1.2	-1.2	-1.2	-1.6	-1.6				
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0				
Single OD tolerance	Min	-1.2	-1.2	-1.2	-1.6	-1.6				
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVICA	0.0	0.0	0.0	1.0	1.0				
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVIGA	0.0	0.0	0.0	1.0	1.0				
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	0.8	0.8	0.8	1.6	1.6				
Difference between largest and smallest OD	IVIOX	0.0	0.0	0.0	1.0	1.0				
V _{Dmp max} [0.0001"]										
Difference between largest average OD and	Max	0.4	0.4	0.4	0.8	0.8				
smallest average OD in different planes										
Kea max [0.0001"]	Max	0.8	0.8	0.8	1.2	1.2				
Assembled bearing outer ring radial runout SD max [0.0001"]										
Outer ring face runout	Max	0.8	0.8	0.8	0.8	1.0				
Sea max [0.0001"]										
Assembled bearing outer ring axial runout	Max	0.8	0.8	0.8	0.8	1.0				
Δ _{CS} Single Bearing [0.0001"]	Max									
Single outer ring width tolerance	Min	Identical to the $\Lambda_{\rm po}$ of the inner ring of the same hearing								
Δ _{CS} Bearing Pair [0.0001"]	Max									
Outer ring pair width tolerance	Min	Identical to the Ass of the inner ring of the same bearing								
V _{CS max} [0.0001"]	IVIIII									
Difference between largest and smallest width	Max	0.8	0.8	0.8	0.8	0.8				
5										



P2 and ABEC 9 Precision Tolerances

In Accordance with ISO 492 and ABMA 20 Standards



Inner Ring Tolerance - Metric										
Nominal ID [mm]		2.5					80			
	Including	10	18	30	50	80	120			
Δ _{dmp} [μm]	Max	0	0	0	0	0	0			
Average ID tolerance	Min	-2.5	-2.5	-2.5	-2.5	-4.0	-5.0			
Δ _{ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	0			
Single ID tolerance	Min	-2.5	-2.5	-2.5	-2.5	-4.0	-5.0			
V _{dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest ID	Max	2.5	2.5	2.5	2.5	2.5	5.0			
V _{dp max} (Bearing Series 60) [μm] Difference between largest and smallest ID	Max	2.5	2.5	2.5	2.5	4.0	5.0			
V _{dp max} (Bearing Series 62) [μm] Difference between largest and smallest ID	Max	2.5	2.5	2.5	2.5	4.0	5.0			
V _{dmp max} [µm] Difference between largest average ID and smallest average ID in different planes	Max	1.5	1.5	1.5	1.5	2.0	2.5			
K _{ia max} [µm] Assembled bearing inner ring radial runout	Max	1.5	1.5	2.5	2.5	2.5	2.5			
S _{d max} [µm] Inner ring face runout	Max	1.5	1.5	1.5	1.5	1.5	2.5			
S _{ia max} [µm] Assembled bearing inner ring axial runout	Max	1.5	1.5	2.5	2.5	2.5	2.0			
Δ _{BS} Single Bearing [μm]	Max	0	0	0	0	0	0			
Single inner ring width tolerance	Min	-40	-80	-120	-120	-150	-200			
Δ _{BS} Bearing Pair [μm]	Max	0	0	0	0	0	0			
Inner ring pair width tolerance	Min	-250	-250	-250	-250	-250	-380			
V _{BS max} [µm] Difference between largest and smallest width	Max	1.5	1.5	1.5	1.5	1.5	2.5			
Long Plant Tolerand Long Pal										

Outer Ring Tolerance - Metric									
Nominal OD [mm]	Above	6	18	30	50	80	120	150	
	Including	18	30	50	80	120	150	180	
Δ _{Dmp} [μm]	Max	0	0	0	0	0	0	0	
Average OD tolerance	Min	-2.5	-4.0	-4.0	-4.0	-5.0	-5.0	-7.0	
Δ _{Ds} (Bearing Series 60 & 62) [μm]	Max	0	0	0	0	0	0	0	
Single OD tolerance	Min	-2.5	-4.0	-4.0	-4.0	-5.0	-5.0	-7.0	
V _{Dp max} (Bearing Series 618 & 619) [µm] Difference between largest and smallest OD	Max	2.5	4.0	4.0	4.0	5.0	5.0	7.0	
V _{Dp max} (Bearing Series 60) [μm] Difference between largest and smallest OD	Max	2.5	4.0	4.0	4.0	5.0	5.0	7.0	
V _{Dp max} (Bearing Series 62) [μm] Difference between largest and smallest OD	Max	2.5	4.0	4.0	4.0	5.0	5.0	7.0	
V _{Dmp max} [µm] Difference between largest average OD and smallest average OD in different planes	Max	1.5	2.0	2.0	2.0	2.5	2.5	3.5	
K _{ea max} [μm] Assembled bearing outer ring radial runout	Max	1.5	2.5	2.5	4.0	5.0	5.0	5.0	
S _{D max} [µm] Outer ring face runout	Max	1.5	1.5	1.5	1.5	2.5	2.5	2.5	
S _{ea max} [µm] Assembled bearing outer ring axial runout	Max	1.5	2.5	2.5	4.0	5.0	5.0	5.0	
Δ _{CS} Single Bearing [μm] Single outer ring width tolerance	Max Min	Identical to the Ape of the inner ring of the same hearing							
Δ _{CS} Bearing Pair [μm] Outer ring pair width tolerance	Max Min	Identical to the Ass of the inner ring of the same hearing							
V _{CS max} [μm] Difference between largest and smallest width	Max	1.5	1.5	1.5	1.5	1.5	2.5	2.5	

Inner Ring Tolerance - Imperial									
Naminal ID (inch)	Above	0.0984	0.3937	0.7087	1.1811	1.9685	3.1496		
Nominal ID [inch]	Including	0.3937	0.7087	1.1811	1.9685	3.1496	4.7244		
Δ _{dmp} [0.0001"]	Max	0	0	0	0	0	0		
Average ID tolerance	Min	-1.0	-1.0	-1.0	-1.0	-1.6	-2.0		
Δ _{ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0	0		
Single ID tolerance	Min	-1.0	-1.0	-1.0	-1.0	-1.6	-2.0		
V _{dp max} (Bearing Series 618 & 619) [0.0001"] Difference between largest and smallest ID	Max	1.0	1.0	1.0	1.0	1.0	2.0		
V _{dp max} (Bearing Series 60) [0.0001"] Difference between largest and smallest ID	Max	1.0	1.0	1.0	1.0	1.6	2.0		
V _{dp max} (Bearing Series 62) [0.0001"] Difference between largest and smallest ID	Max	1.0	1.0	1.0	1.0	1.6	2.0		
V _{dmp max} [0.0001"] Difference between largest average ID and smallest average ID in different planes	Max	0.6	0.6	0.6	0.6	0.8	1.0		
K _{ia max} [0.0001"] Assembled bearing inner ring radial runout	Max	0.6	0.6	1.0	1.0	1.0	1.0		
S _{d max} [0.0001"] Inner ring face runout	Max	0.6	0.6	0.6	0.6	0.6	1.0		
S _{ia max} [0.0001"] Assembled bearing inner ring axial runout	Max	0.6	0.6	1.0	1.0	1.0	0.8		
Δ _{BS} Single Bearing [0.0001"]	Max	0	0	0	0	0	0		
Single inner ring width tolerance	Min	-15.7	-31.5	-47.2	-47.2	-59.1	-78.7		
Δ _{BS} Bearing Pair [0.0001"]	Max	0	0	0	0	0	0		
Inner ring pair width tolerance	Min	-98.4	-98.4	-98.4	-98.4	-98.4	-149.6		
V _{BS max} [0.0001"] Difference between largest and smallest width	Max	0.6	0.6	0.6	0.6	0.6	1.0		

Outer Ring Tolerance - Imperial										
Nominal OD [Inch]	Above	0.2362	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055		
	Including	0.7087	1.1811	1.9685	3.1496	4.7244	5.9055	7.0866		
Δ _{Dmp} [0.0001"]	Max	0	0	0	0	0	0	0		
Average OD tolerance	Min	-1.0	-1.6	-1.6	-1.6	-2.0	-2.0	-2.8		
Δ _{Ds} (Bearing Series 60 & 62) [0.0001"]	Max	0	0	0	0	0	0	0		
Single OD tolerance	Min	-1.0	-1.6	-1.6	-1.6	-2.0	-2.0	-2.8		
V _{Dp max} (Bearing Series 618 & 619) [0.0001"]	Max	1.0	1.6	1.6	1.6	2.0	2.0	2.8		
Difference between largest and smallest OD	IVIAA	1.0								
V _{Dp max} (Bearing Series 60) [0.0001"]	Max	1.0	1.6	1.6	1.6	2.0	2.0	2.8		
Difference between largest and smallest OD	IVIGA	1.0								
V _{Dp max} (Bearing Series 62) [0.0001"]	Max	1.0	1.6	1.6	1.6	2.0	2.0	2.8		
Difference between largest and smallest OD	IVIUX	1.0	1.0	1.0	1.0	2.0	2.0	2.0		
V _{Dmp max} [0.0001"]										
Difference between largest average OD and	Max	0.6	0.8	0.8	0.8	1.0	1.0	1.4		
smallest average OD in different planes										
Kea max [0.0001"]	Max	0.6	1.0	1.0	1.6	2.0	2.0	2.0		
Assembled bearing outer ring radial runout										
S _{D max} [0.0001"]	Max	0.6	0.6	0.6	0.6	1.0	1.0	1.0		
Outer ring face runout										
Sea max [0.0001"]	Max	0.6	1.0	1.0	1.6	2.0	2.0	2.0		
Assembled bearing outer ring axial runout	May									
Δ _{CS} Single Bearing [0.0001"]		Max Identical to the Δ_{BS} of the inner ring of the same bearing								
Single outer ring width tolerance	Min Min Moraldon to the Aggs of the miner ring of the scaling									
Δ _{CS} Bearing Pair [0.0001"] Outer ring pair width tolerance	Min	Max Identical to the Δ_{BS} of the inner ring of the same bearing								
V _{CS max} [0.0001"]	iviin	IVIII								
Difference between largest and smallest width	Max	0.6	0.6	0.6	0.6	0.6	1.0	1.0		