

Miniature Bearings Australia

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Bearing Tolerances (440C Stainless and SAE52100 Chrome)

Abec 1 or ISO P6 gradings apply to all precision bearings in our catalogue made from SAE52100 or 440C Stainless Steel unless otherwise specified. The section of our bearing part number that specifies the grade is found near the end, preceded by the country of manufacture code. The following list shows most of our country/precision designations. eg jP6 = Japanese P6 Precision

Country Codes

- No designation: Sourced from multiple countries
- gr: Germany
- j: Japan
- u: USA
- s: Switzerland

No country of manufacture is specified in the part number of Abec 1 bearings since they are the most common bearings and supplies may be obtained from a number of different countries as required by demand and/or pricing. The majority of our Abec 1 bearings are Japanese manufactured.

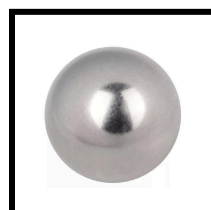


Precision Designation

- No designation: Abec 1
- P6: ISO P6 precision
- 3: Abec 3 precision
- P5: ISO P5 precision
- 5: Abec 5 precision
- P4: ISO P4 Precision
- 7: Abec 7 Precision

Dimensions are in 0.001 mm (thousandths of a mm)

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Each table below covers either inner or outer ring tolerances for a defined size range as specified in the headers.

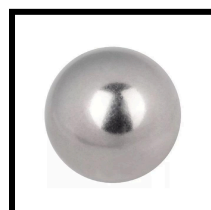
Tolerances for Inner Rings

Inner Rings with a Bore ≥ 0.6 mm and ≤ 2.5 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -8	10	0 to -40	12	-	-	10
Abec 1	0 to -7.5	10	-	-	-	-	7.5
ISO P6	0 to -7	8	0 to -40	12	-	-	5
Abec 3	0 to -5	7.5	0 to -125	-	-	-	5
ISO P5	0 to -5	5	0 to -40	5	7.5	7.5	4
ISO P5A	0 to -5	3	0 to -25	5	7.5	7.5	3.5
Abec 5	0 to -5	5	0 to -40	5	7.5	7.5	3.5
Abec 5P	0 to -5	2.5	0 to -25	5	7.5	7.5	3.5
ISO P4	0 to -4	4	0 to -40	2.5	3	3	2.5
ISO P4A	0 to -5	2.5	0 to -25	2.5	3	3	2.5
Abec 7	0 to -4	4	0 to -40	2.5	2.5	2.5	2.5
Abec 7P	0 to -5	2.5	0 to -25	2.5	2.5	2.5	2.5
ISO P2	0 to -2.5	2.5	0 to -25	1.5	1.5	1.5	1.5
Abec 9	0 to -2.5	2.5	0 to -40	1.25	1.25	1.25	1.25
Abec 9P	0 to -2.5	1.25	0 to -25	1.25	1.25	1.25	1.25

Dimensions are in 0.001 mm (thousandths of a mm)

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Tolerances for Inner Rings

Inner Rings with a Bore > 2.5 mm and <= 10 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -8	10	0 to -120	15	-	-	10
Abec 1	0 to -7.5	10	0 to -125	-	-	-	7.5
ISO P6	0 to -7	8	0 to -120	15	-	-	6
Abec 3	0 to -5	7.5	0 to -125	-	-	-	5
ISO P5	0 to -5	5	0 to -40	5	7.5	7.5	4
ISO P5A	0 to -5	3	0 to -25	5	7.5	7.5	3.5
Abec 5	0 to -5	5	0 to -40	5	7.5	7.5	3.5
Abec 5P	0 to -5	2.5	0 to -25	5	7.5	7.5	3.5
ISO P4	0 to -4	4	0 to -40	2.5	3	3	2.5
ISO P4A	0 to -5	2.5	0 to -25	2.5	3	3	2.5
Abec 7	0 to -4	4	0 to -40	2.5	2.5	2.5	2.5
Abec 7P	0 to -5	2.5	0 to -25	2.5	2.5	2.5	2.5
ISO P2	0 to -2.5	2.5	0 to -40	1.5	1.5	1.5	1.5
Abec 9	0 to -2.5	2.5	0 to -40	1.25	1.25	1.25	1.25
Abec 9P	0 to -2.5	1.25	0 to -25	1.25	1.25	1.25	1.25

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Tolerances for Inner Rings

Inner Rings with a Bore > 10 mm and <= 18 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -8	10	0 to -120	20	-	-	10
Abec 1	0 to -7.5	10	0 to -125	-	-	-	11
ISO P6	0 to -7	8	0 to -120	20	-	-	7
Abec 3	0 to -5	7.5	0 to -125	-	-	-	5
ISO P5	0 to -5	5	0 to -80	5	7.5	7.5	4
ISO P5A	0 to -5	3	0 to -25	5	7.5	7.5	3.5
Abec 5	0 to -5	5	0 to -80	5	7.5	7.5	3.5
Abec 5P	0 to -5	2.5	0 to -25	5	7.5	7.5	3.5
ISO P4	0 to -4	4	0 to -80	2.5	3	3	2.5
ISO P4A	0 to -5	2.5	0 to -25	2.5	3	3	2.5
Abec 7	0 to -4	4	0 to -80	2.5	2.5	2.5	2.5
Abec 7P	0 to -5	2.5	0 to -25	2.5	2.5	2.5	2.5
ISO P2	0 to -2.5	2.5	0 to -80	1.5	1.5	1.5	1.5
Abec 9	0 to -2.5	2.5	0 to -80	1.25	1.25	1.25	1.25
Abec 9P	0 to -2.5	1.25	0 to -25	1.25	1.25	1.25	1.25

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Tolerances for Inner Rings

Inner Rings with a Bore > 18 mm and <= 30 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -10	13	0 to -120	20	-	-	13
Abec 1	0 to -11	13	0 to -120	20	-	-	13
ISO P6	0 to -8	10	0 to -120	20	-	-	8
Abec 3	0 to -8	10	0 to -120	20	-	-	8
ISO P5	0 to -6	6	0 to -120	5	8	8	4
Abec 5	0 to -6	6	0 to -120	5	8	8	4
Abec 5P	0 to -5	2.5	0 to -25	5	8	8	4
ISO P4	0 to -5	5	0 to -120	2.5	4	4	2.5
Abec 7	0 to -5	5	0 to -120	2.5	4	4	2.5
Abec 7P	0 to -5	5	0 to -25	2.5	4	4	2.5
ISO P2	0 to -2.5	2.5	0 to -120	1.5	2.5	1.5	2.5
Abec 9	0 to -2.5	2.5	0 to -120	1.25	2.5	1.25	2.5
Abec 9P	0 to -2.5	1.25	0 to -25	1.25	1.25	1.25	2.5

Dimensions are in 0.001 mm (thousandths of a mm)

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Tolerances for Inner Rings

Inner Rings with a Bore > 30 mm and <= 50 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -12	15	0 to -120	20	-	-	15
Abec 1	0 to -12	15	0 to -120	20	-	-	15
ISO P6	0 to -10	13	0 to -120	20	-	-	10
Abec 3	0 to -10	13	0 to -120	20	-	-	10
ISO P5	0 to -8	8	0 to -120	8	8	8	5
Abec 5	0 to -8	8	0 to -120	8	8	8	5
ISO P4	0 to -6	6	0 to -120	6	4	4	4
Abec 7	0 to -6	6	0 to -120	6	4	4	4
ISO P2	0 to -2.5	2.5	0 to -120	1.5	2.5	1.5	2.5
Abec 9	0 to -2.5	2.5	0 to -120	1.5	2.5	1.5	2.5

Dimensions are in 0.001 mm (thousandths of a mm)

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Tolerances for Inner Rings

Inner Rings with a Bore > 50 mm and <= 80 mm

Precision Grade	Mean Bore Deviation Δdmp	Bore Deviation Limit Vdp	Width Deviation ΔBs	Max Side Deviation from Parallel ΔVBs	Track Parallel with Side Sia	Bore Square with Side Sd	Eccentricity of Tracks Kia
ISO P0	0 to -15	19	0 to -150	25	-	-	20
Abec 1	0 to -15	19	0 to -150	25	-	-	20
ISO P6	0 to -12	15	0 to -150	25	-	-	10
Abec 3	0 to -12	15	0 to -150	25	-	-	10
ISO P5	0 to -9	9	0 to -150	6	8	8	5
Abec 5	0 to -9	9	0 to -150	6	8	8	5
ISO P4	0 to -7.5	7.5	0 to -150	4	5	5	4
Abec 7	0 to -7.5	7.5	0 to -150	4	5	5	4
ISO P2	0 to -4	4	0 to -150	1.5	2.5	1.5	2.5
Abec 9	0 to -4	4	0 to -150	1.5	2.5	1.5	2.5

Dimensions are in 0.001 mm (thousandths of a mm)

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Tolerances for Outer Rings

Outer Rings with an OD > 2.5 mm and <= 18 mm

Precision Grade	Mean Outer Deviation Δdmp	Absolute Limit of Outside Diameter Deviation Vdp	Width Deviation ΔCs	Max Side Deviation from Parallel ΔVCs	Track Parallel with Side Sea	OD Square with Side Sd	Eccentricity of Tracks Kea
ISO P0	0 to -8	10			-	-	15
Abec 1	0 to -7.5	10			-	-	15
ISO P6	0 to -7	9			-	-	8
Abec 3	0 to -7.5	9			-	-	7.5
ISO P5	0 to -5	5			8	8	5
ISO P5A	0 to -5	3			8	8	5
Abec 5	0 to -5	5	Based on Bore Size Tables	Based on Bore Size Tables	7.5	7.5	5
Abec 5P	0 to -5	5			7.5	7.5	5
ISO P4	0 to -4	4			5	4	3
ISO P4A	0 to -4	2.5			5	4	3.5
Abec 7	0 to -5	4			5	4	4
Abec 7P	0 to -5	5			4	4	4
ISO P2	0 to -2.5	2.5			1.5	1.5	1.5
Abec 9	0 to -2.5	2.5			1.25	1.25	1.25
Abec 9P	0 to -2.5	0.5			1.25	1.25	1.25

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Tolerances for Outer Rings

Outer Rings with an OD > 18 mm and <= 30 mm

Precision Grade	Mean Outer Deviation Δdmp	Absolute Limit of Outside Diameter Deviation Vdp	Width Deviation ΔCs	Max Side Deviation from Parallel ΔVCs	Track Parallel with Side Sea	OD Square with Side Sd	Eccentricity of Tracks Kea
ISO P0	0 to -9	12			-	-	15
Abec 1	0 to -10	11			-	-	15
ISO P6	0 to -8	10			-	-	9
Abec 3	0 to -7.5	10			-	-	9
ISO P5	0 to -6	6			8	8	6
ISO P5A	0 to -6	3			8	8	6
Abec 5	0 to -5	6	Based on Bore Size Tables	Based on Bore Size Tables	7.5	7.5	5
Abec 5P	0 to -5	5			7.5	7.5	5
ISO P4	0 to -5	5			5	4	4
ISO P4A	0 to -5	2.5			5	4	4
Abec 7	0 to -5	5			5	4	4
Abec 7P	0 to -5	5			5	4	4
ISO P2	0 to -4	4			2.5	1.5	2.5
Abec 9	0 to -4	4			2.5	1.25	2.5
Abec 9P	0 to -4	0.8	2.5	1.25	2.5		

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Tolerances for Outer Rings

Outer Rings with an OD > 30 mm and <= 50 mm

Precision Grade	Mean Outer Deviation Δdmp	Absolute Limit of Outside Diameter Deviation Vdp	Width Deviation ΔCs	Max Side Deviation from Parallel ΔVCs	Track Parallel with Side Sea	OD Square with Side Sd	Eccentricity of Tracks Kea
ISO P0	0 to -11	14			-	-	20
Abec 1	0 to -11	14			-	-	20
ISO P6	0 to -9	14			-	-	10
Abec 3	0 to -9	14			-	-	10
ISO P5	0 to -7	7			8	8	7
Abec 5	0 to -7.5	7.5			7.5	7.5	7.5
Abec 5P	0 to -5	5	Based on Bore Size Tables	Based on Bore Size Tables	7.5	7.5	5
ISO P4	0 to -6	6			5	4	5
Abec 7	0 to -6	6			5	4	5
Abec 7P	0 to -5	5			5	4	4
ISO P2	0 to -4	4			2.5	1.5	2.5
Abec 9	0 to -4	4			2.5	1.25	2.5
Abec 9P	0 to -4	-			2.5	1.25	2.5

Dimensions are in 0.001 mm (thousandths of a mm)

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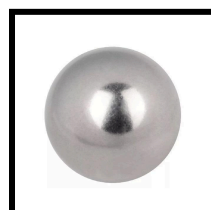
Tolerances for Outer Rings

Outer Rings with an OD > 50 mm and <= 80 mm

Precision Grade	Mean Outer Deviation Δdmp	Absolute Limit of Outside Diameter Deviation Vdp	Width Deviation ΔCs	Max Side Deviation from Parallel ΔVCs	Track Parallel with Side Sea	OD Square with Side Sd	Eccentricity of Tracks Kea
ISO P0	0 to -13	16			-	-	25
Abec 1	0 to -13	17			-	-	25
ISO P6	0 to -11	16			-	-	13
Abec 3	0 to -11	16			-	-	13
ISO P5	0 to -9	9	Based on Bore Size Tables	Based on Bore Size Tables	10	8	8
Abec 5	0 to -9	9			10	7.5	7.5
ISO P4	0 to -7	7			5	4	5
Abec 7	0 to -7.5	7.5			5	4	5
ISO P2	0 to -4	4			4	1.5	4
Abec 9	0 to -4	4			4	1.25	4

Dimensions are in 0.001 mm (thousandths of a mm)

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Tolerances for Outer Rings

Outer Rings with an OD > 80 mm and <= 120 mm

Precision Grade	Mean Outer Deviation Δdmp	Absolute Limit of Outside Diameter Deviation Vdp	Width Deviation ΔCs	Max Side Deviation from Parallel ΔVCs	Track Parallel with Side Sea	OD Square with Side Sd	Eccentricity of Tracks Kea
ISO P0	0 to -15	19			-	-	35
Abec 1	0 to -16	19			-	-	35
ISO P6	0 to -13	17			-	-	18
Abec 3	0 to -13	17			-	-	18
ISO P5	0 to -10	10	Based on Bore Size Tables	Based on Bore Size Tables	11	9	10
Abec 5	0 to -10	10			11	9	10
ISO P4	0 to -8	8			6	5	6
Abec 7	0 to -7.5	7.5			6	5	6
ISO P2	0 to -5	5			5	2.5	5
Abec 9	0 to -5	5			5	2.5	5

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Tolerances in Simple Terms:

A tolerance is the amount of variation allowed. If I require a box of 1000 screws +/- 5, this means I can accept a box containing anything from 995 to 1005 screws. If a supplier states they can supply a box of 1000 +/- 2, this means their box contains anything from 998 to 1002 screws. The higher accuracy still meets my requirement of +/- 5. The same principle applies for tolerances of size, clearance, hardness or anything else.

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Tables and information on this web site should be read as a general guide only.

All relevant standards should be consulted to ensure the accuracy of information presented.

See also

[Ball Grades](#) information sheet

[Abec Information](#)

[Bearing Precision](#)

[Bearing Tolerances for 316 Stainless & Plastic](#)

[Measuring Small Parts](#)

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