CNC TOLERANCE STANDARDS

RP Group can assure the most stringent tolerances possible based on the specifications provided by a customer's 2D drawing. In the absence of a drawing, all components are manufactured according to our ISO 2768 medium standard.

STRAIGHTNESS

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 10	0.0500	0.0020	0.0080	0.0003
> 10~16	0.0500	0.0020	0.0100	0.0004
> 16~25	0.0500	0.0020	0.0120	0.0005
> 25~40	0.0500	0.0020	0.0150	0.0006
> 40~63	0.0500	0.0020	0.0200	0.0008
> 63~100	0.0500	0.0020	0.0250	0.0010
> 100~160	0.1000	0.0039	0.0300	0.0012
> 160~250	0.1500	0.0059	0.0400	0.0016
> 250~400	0.2000	0.0079	0.0500	0.0020
> 400~630	0.2500	0.0098	0.0600	0.0024
> 630~1000	0.3000	0.0118	0.0800	0.0031
> 1000~1600	0.3500	0.0138	0.1000	0.0039
> 1600~2500	0.4000	0.0157	0.1200	0.0047
> 2500~4000	0.4500	0.0177	0.1500	0.0059
> 4000~6300	0.5000	0.0197	0.2000	0.0079
> 6300~10000	1.0000	0.0394	0.2500	0.0098

FLATNESS

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 10	0.0500	0.0020	0.0080	0.0003
> 10~16	0.0500	0.0020	0.0100	0.0004
> 16~25	0.0500	0.0020	0.0120	0.0005
> 25~40	0.0500	0.0020	0.0150	0.0006
> 40~63	0.0500	0.0020	0.0200	0.0008
> 63~100	0.0500	0.0020	0.0250	0.0010
> 100~160	0.1000	0.0039	0.0300	0.0012
> 160~250	0.1500	0.0059	0.0400	0.0016
> 250~400	0.2000	0.0079	0.0500	0.0020
> 400~630	0.2500	0.0098	0.0600	0.0024
> 630~1000	0.3000	0.0118	0.0800	0.0031
> 1000~1600	0.3500	0.0138	0.1000	0.0039
> 1600~2500	0.4000	0.0157	0.1200	0.0047
> 2500~4000	0.4500	0.0177	0.1500	0.0059
> 4000~6300	0.5000	0.0197	0.2000	0.0079
> 6300~10000	1.0000	0.0394	0.2500	0.0098

PARALLELISM

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 10	0.0500	0.0020	0.0200	0.0008
> 10~16	0.0500	0.0020	0.0250	0.0010
> 16~25	0.0500	0.0020	0.0300	0.0012
> 25~40	0.0500	0.0020	0.0400	0.0016
> 40~63	0.0500	0.0020	0.0500	0.0020
> 63~100	0.0500	0.0020	0.0600	0.0024
> 100~160	0.1000	0.0039	0.0800	0.0031
> 160~250	0.1500	0.0059	0.1000	0.0039
> 250~400	0.2000	0.0079	0.1200	0.0047
> 400~630	0.2500	0.0098	0.1500	0.0059
> 630~1000	0.3000	0.0118	0.2000	0.0079
> 1000~1600	0.3500	0.0138	0.2500	0.0098
> 1600~2500	0.4000	0.0157	0.3000	0.0118
> 2500~4000	0.4500	0.0177	0.4000	0.0157
> 4000~6300	0.5000	0.0197	0.5000	0.0197
> 6300~10000	1.0000	0.0394	0.6000	0.0236

PERPENDICULARITY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 10	0.0500	0.0020	0.0200	0.0008
> 10~16	0.0500	0.0020	0.0250	0.0010
> 16~25	0.0500	0.0020	0.0300	0.0012
> 25~40	0.0500	0.0020	0.0400	0.0016
> 40~63	0.0500	0.0020	0.0500	0.0020
> 63~100	0.0500	0.0020	0.0600	0.0024
> 100~160	0.1000	0.0039	0.0800	0.0031
> 160~250	0.1500	0.0059	0.1000	0.0039
> 250~400	0.2000	0.0079	0.1200	0.0047
> 400~630	0.2500	0.0098	0.1500	0.0059
> 630~1000	0.3000	0.0118	0.2000	0.0079
> 1000~1600	0.3500	0.0138	0.2500	0.0098
> 1600~2500	0.4000	0.0157	0.3000	0.0118
> 2500~4000	0.4500	0.0177	0.4000	0.0157
> 4000~6300	0.5000	0.0197	0.5000	0.0197
> 6300~10000	1.0000	0.0394	0.6000	0.0236

ANGULARITY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 10	0.0500	0.0020	0.0200	0.0008
> 10~16	0.0500	0.0020	0.0250	0.0010
> 16~25	0.0500	0.0020	0.0300	0.0012
> 25~40	0.0500	0.0020	0.0400	0.0016
> 40~63	0.0500	0.0020	0.0500	0.0020
> 63~100	0.0500	0.0020	0.0600	0.0024
> 100~160	0.1000	0.0039	0.0800	0.0031
> 160~250	0.1500	0.0059	0.1000	0.0039
> 250~400	0.2000	0.0079	0.1200	0.0047
> 400~630	0.2500	0.0098	0.1500	0.0059
> 630~1000	0.3000	0.0118	0.2000	0.0079
> 1000~1600	0.3500	0.0138	0.2500	0.0098
> 1600~2500	0.4000	0.0157	0.3000	0.0118
> 2500~4000	0.4500	0.0177	0.4000	0.0157
> 4000~6300	0.5000	0.0197	0.5000	0.0197
> 6300~10000	1.0000	0.0394	0.6000	0.0236

CIRCULARITY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 3	0.0500	0.0020	0.0400	0.0002
> 3~6	0.0500	0.0020	0.0050	0.0002
> 6~10	0.0500	0.0020	0.0060	0.0002
> 10~18	0.0500	0.0020	0.0080	0.0003
> 18~30	0.0500	0.0020	0.0090	0.0004
> 30~50	0.0500	0.0020	0.0110	0.0004
> 50~80	0.1000	0.0039	0.0130	0.0005
> 80~120	0.1500	0.0059	0.0150	0.0006
> 120~180	0.2000	0.0079	0.0180	0.0007
> 180~250	0.2500	0.0098	0.0200	0.0008
> 250~315	0.3000	0.0118	0.0230	0.0009
> 315~400	0.3500	0.0138	0.0250	0.0010
> 400~500	0.5000	0.0197	0.0270	0.0011

CYLINDRICITY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 3	0.0500	0.0020	0.0400	0.0002
> 3~6	0.0500	0.0020	0.0050	0.0002
> 6~10	0.0500	0.0020	0.0060	0.0002
> 10~18	0.0500	0.0020	0.0080	0.0003
> 18~30	0.0500	0.0020	0.0090	0.0004
> 30~50	0.0500	0.0020	0.0110	0.0004
> 50~80	0.1000	0.0039	0.0130	0.0005
> 80~120	0.1500	0.0059	0.0150	0.0006
> 120~180	0.2000	0.0079	0.0180	0.0007
> 180~250	0.2500	0.0098	0.0200	0.0008
> 250~315	0.3000	0.0118	0.0230	0.0009
> 315~400	0.3500	0.0138	0.0250	0.0010
> 400~500	0.5000	0.0197	0.0270	0.0011

CONCENTRICITY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 1	0.0500	0.0020	0.0060	0.0002
> 1~3	0.0500	0.0020	0.0060	0.0002
> 3~6	0.0500	0.0020	0.0080	0.0003
> 6~10	0.0500	0.0020	0.0100	0.0004
> 10~18	0.0500	0.0020	0.0120	0.0005
> 18~30	0.0500	0.0020	0.0150	0.0006
> 30~50	0.1000	0.0039	0.0200	0.0008
> 50~120	0.1500	0.0059	0.0250	0.0010
> 120~250	0.2000	0.0079	0.0300	0.0012
> 250~500	0.2500	0.0098	0.0400	0.0016
> 500~800	0.3000	0.0118	0.0500	0.0020
> 800~1250	0.3500	0.0138	0.0600	0.0024
> 1250~2000	0.4000	0.0157	0.0800	0.0031
> 2000~3150	0.5000	0.0197	0.1000	0.0039
> 3150~5000	1.0000	0.0394	0.1200	0.0047
> 5000~8000	1.5000	0.0591	0.1500	0.0059
>8000~10000	2.0000	0.0787	0.2000	0.0079

SYMMETRY

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 1	0.0500	0.0020	0.0060	0.0002
> 1~3	0.0500	0.0020	0.0060	0.0002
> 3~6	0.0500	0.0020	0.0080	0.0003
> 6~10	0.0500	0.0020	0.0100	0.0004
> 10~18	0.0500	0.0020	0.0120	0.0005
> 18~30	0.0500	0.0020	0.0150	0.0006
> 30~50	0.1000	0.0039	0.0200	0.0008
> 50~120	0.1500	0.0059	0.0250	0.0010
> 120~250	0.2000	0.0079	0.0300	0.0012
> 250~500	0.2500	0.0098	0.0400	0.0016
> 500~800	0.3000	0.0118	0.0500	0.0020
> 800~1250	0.3500	0.0138	0.0600	0.0024
> 1250~2000	0.4000	0.0157	0.0800	0.0031
> 2000~3150	0.5000	0.0197	0.1000	0.0039
> 3150~5000	1.0000	0.0394	0.1200	0.0047
> 5000~8000	1.5000	0.0591	0.1500	0.0059
>8000~10000	2.0000	0.0787	0.2000	0.0079

CIRCULAR RUNOUT

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 1	0.0500	0.0020	0.0060	0.0002
> 1~3	0.0500	0.0020	0.0060	0.0002
> 3~6	0.0500	0.0020	0.0080	0.0003
> 6~10	0.0500	0.0020	0.0100	0.0004
> 10~18	0.0500	0.0020	0.0120	0.0005
> 18~30	0.0500	0.0020	0.0150	0.0006
> 30~50	0.1000	0.0039	0.0200	0.0008
> 50~120	0.1500	0.0059	0.0250	0.0010
> 120~250	0.2000	0.0079	0.0300	0.0012
> 250~500	0.2500	0.0098	0.0400	0.0016
> 500~800	0.3000	0.0118	0.0500	0.0020
> 800~1250	0.3500	0.0138	0.0600	0.0024
> 1250~2000	0.4000	0.0157	0.0800	0.0031
> 2000~3150	0.5000	0.0197	0.1000	0.0039
> 3150~5000	1.0000	0.0394	0.1200	0.0047
> 5000~8000	1.5000	0.0591	0.1500	0.0059
>8000~10000	2.0000	0.0787	0.2000	0.0079

TOTAL RUNOUT

*Normal condition; metal parts; low risk of deformation

Dimension Range	US Tolerance		China Tolerance	
	Metric	Imperial	Metric	Imperial
≤ 1	0.0500	0.0020	0.0060	0.0002
> 1~3	0.0500	0.0020	0.0060	0.0002
> 3~6	0.0500	0.0020	0.0080	0.0003
> 6~10	0.0500	0.0020	0.0100	0.0004
> 10~18	0.0500	0.0020	0.0120	0.0005
> 18~30	0.0500	0.0020	0.0150	0.0006
> 30~50	0.1000	0.0039	0.0200	0.0008
> 50~120	0.1500	0.0059	0.0250	0.0010
> 120~250	0.2000	0.0079	0.0300	0.0012
> 250~500	0.2500	0.0098	0.0400	0.0016
> 500~800	0.3000	0.0118	0.0500	0.0020
> 800~1250	0.3500	0.0138	0.0600	0.0024
> 1250~2000	0.4000	0.0157	0.0800	0.0031
> 2000~3150	0.5000	0.0197	0.1000	0.0039
> 3150~5000	1.0000	0.0394	0.1200	0.0047
> 5000~8000	1.5000	0.0591	0.1500	0.0059
>8000~10000	2.0000	0.0787	0.2000	0.0079