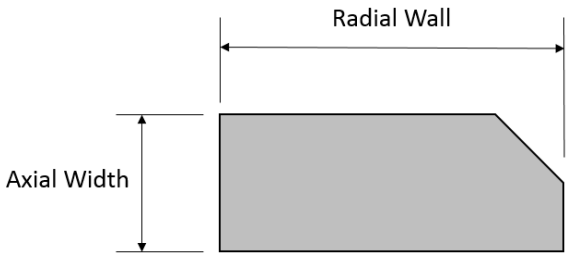
RING INSTALLATION GUIDELINES

***Disclaimer: Due to the nature of performance racing applications, all performance sets are sold without any express or implied warranty of fitness or merchantability for a particular purpose**

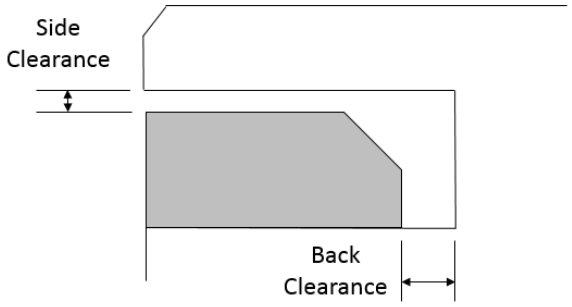
Radial Wall

Ring width in the radial direction from outside diameter to inside diameter. Modern performance engines often utilize rings with reduced radial walls, which reduces reciprocating mass, improves sealing conformability and reduces friction and drag to gain horsepower.



Axial Width

Ring width in the axial direction from top side to bottom side. Axial width dimensions are standardized to ensure that piston and ring manufacturers machine parts to fit together with proper clearances. Modern performance engines continue to follow the trend of reduced axial width for all the reasons previously mentioned above.

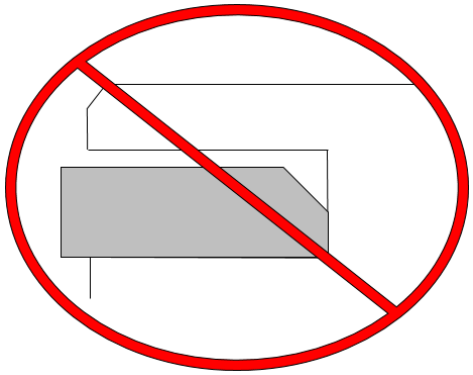


Side Clearance

Side, or lateral, clearance is the difference between the width of the piston ring groove and the width of the ring itself. In performance applications it is recommended to have .001”-.003” side clearance for best performance.

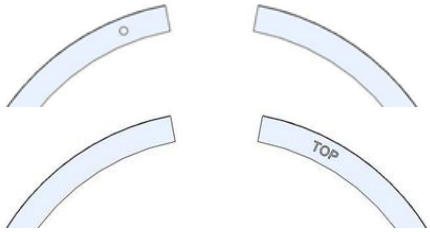
Back Clearance

Back clearance is the difference between the depth of the piston groove and the radial wall of the ring. It is critical that the piston ring does not protrude past the adjacent piston land or severe engine damage will occur.



Orientation on Piston

Piston rings come in many different shapes and it’s important that rings get installed the correct direction to perform as intended. All rings which are considered directional will have either a DOT or laser mark “TOP” on either side of the gap. This marking identifies the top of the ring and should be installed face UP so that it can be seen when looking at the top of the piston. Installing rings incorrectly will result in poor performance and engine failure can occur. No marking indicates the ring is non-directional and can be installed either way. The laser mark “TOP” does NOT indicate the ring is for the 1st piston groove.



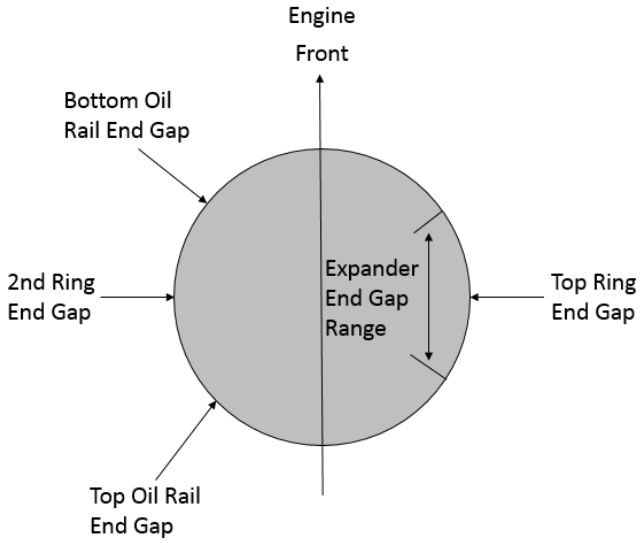
End Gap

A common practice in performance applications is file fitting piston end gaps to a precise end gap using slightly oversized rings. Most Performance Ring sets are available in file fit (+.005") oversizes. The end gap refers to the clearance between the two ends of the piston ring when installed into the cylinder bore. File fitting end gaps is best done with a professional ring grinding tool, however if filing by hand always file from the outside diameter towards the inside diameter to avoid chipping of the face coating. It is recommended to file fit equal amounts from each side of the gap while keeping the gap ends square and parallel.

The recommended end gap is determined by the bore size and the application which the ring set will be utilized. Below is a chart which contains the recommended end gap factor. To use this chart, multiply the bore size by the ring end gap factor to obtain the minimum end gap which should be achieved. Example: 4.000" bore street engine with cast piston the top ring end gap factor is .004", thus 4.000" x .004" = .016" minimum end gap. It should be observed that for every .001" increase in bore diameter the ring end gap is increased by .003".

APPLICATION	TOP RING		2nd RING	OIL RAIL
	Cast or Forged Piston	Hypereutectic Piston	All Pistons	All Pistons
Street	Bore x .004"	Bore x .0065"	Bore x .0045"	Minimum .015"
Street/Strip	Bore x .0045"	Bore x .0065"	Bore x .005"	
Circle Track/Drag	Bore x .005"	Bore x .007"	Bore x .0055"	
Forced Induction up to 15 lbs	Bore x .006"	Bore x .0085"	Bore x .0065"	
Forced Induction over 15 lbs	Bore x .007"	Bore x .009"	Bore x .0075"	
Nitrous up to 200HP	Bore x .006"	Bore x .0085"	Bore x .0065"	
Nitrous over 200HP	Bore x .007"	Bore x .009"	Bore x .0075"	

End Gap Orientation



Boring and Honing

The practice of boring and honing has become a very complex practice for modern performance engines. The following are generic guidelines, however any further questions related to boring or honing should be consulted with boring and honing professionals.

Material Stock Removal

- .003" with 80 – 100 grit stone
- .0015" with 280 – 320 grit stone
- .0005" with 400 – 600 grit stone

If surface finish can be measured using a profilometer the recommend values for generic performance applications is as follows:

- Reduced Peak Height (Rpk): 8 – 12 µ"
- Core Roughness Depth (Rk): 25 – 35 µ"
- Reduced Valley Depth (Rvk): 40 – 50 µ"
- Roughness Average (Ra): 15 – 20 µ"

For high end performance applications such as Pro-Stock & NASCAR the surface finishes are much smoother to provide less friction but also much less life:

- Reduced Peak Height (Rpk): 3 – 5 µ"
- Core Roughness Depth (Rk): 12 – 18 µ"
- Reduced Valley Depth (Rvk): 20 – 25 µ"