

### TOP RING INSTALLATION:

If the ring has a dot or laser marking then this side will face up. If there is no dot look for an inner bevel and install this facing up. If there is neither a bevel or any other marking the ring can be installed either way. (Non directional).

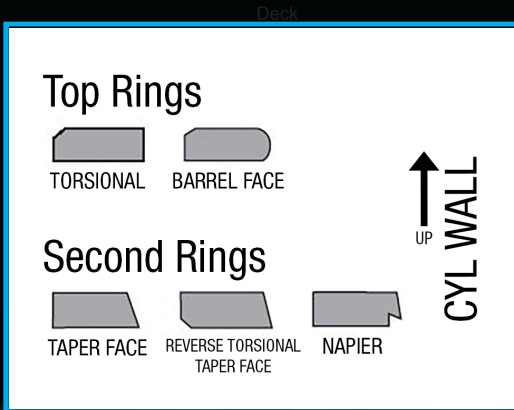
### SECOND RING INSTALLATION:

If the ring has a dot or laser marking this side will face up. If there is no dot look for an inner bevel and install this facing down. If you do not see either refer to the diagram.

***It is very important not to install the 2nd ring upside down otherwise it will pump oil into the combustion chamber.***

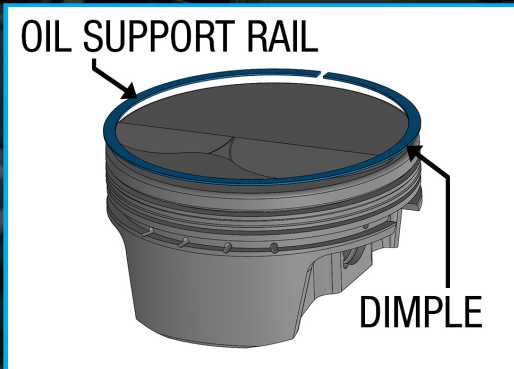
### OIL RING INSTALLATION:

Install the expander into the ring groove followed by the rails. The rails should be offset about 180°



### OIL SUPPORT RAIL INSTALLATION:

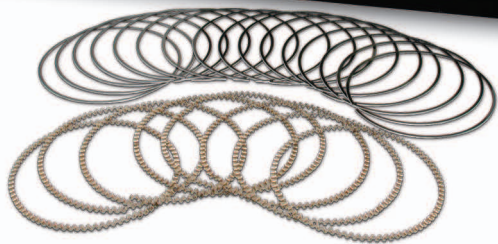
In applications where the pin bore protrudes into the oil ring groove a rail support needs to be used. Install the rail support at the bottom of the oil ring groove with the dimple in the pin bore facing down.



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## INSTALLATION SPECIFICATION SHEET



### Determining Ring Gap

To determine the ring end gap look for your application in the proceeding table. ALL BORES MUST BE CONVERTED TO INCHES. Example: Bore size is 81mm – to find top ring end gap for a street application:

$$81\text{mm}/25.4 = 3.189\text{ inches}$$

$$(3.189 \times .005) = .016"$$

.016" is the minimum allowable clearance.

### NOTE

If the ring gap is less than the minimum specified for your bore size, it will be necessary to file fit the rings to achieve proper end gap.

### Ring Filing Procedures

1. Ring gap should be filed using a ring filing tool.
2. Ring gap should be filed in an inward direction and square to the sides.

**Important: Ring sets are manufactured to fit specific bores. For every .001" over the intended bore size, ring gap will increase by .00314"**

## CP-CARRILLO RING RECOMMENDATIONS

Failure to check ring gap can result in severe engine failure. The following end gap recommendations are general guidelines. The best ring gap for any particular engine and application varies. Increased clearance is generally needed for forced induction, nitrous, filled blocks, endurance racing and other extreme applications. The final end gap suitable for the engine is the full responsibility of the engine builder. If you have any questions, please call 949-567-9000 for technical support.

### RING GAP MEASURING PROCEDURES

1. A torque plate should be installed on engine (if applicable) and torqued to same specifications as machine shop.
2. Piston ring should be below and square to the deck.
3. Measure ring end gap with a feeler gauge.

Ring End Gap Chart

APPLICATION	TOP RING	SECOND RING	OIL RING
Street / Hi Performance	Bore x .0045"	.004" - .008" Bigger than top ring	Min..015"
Drag Racing Road Racing	Bore x .005"	.004" - .008" Bigger than top ring	Min..015"
Nitrous/Turbo Supercharged	Bore x .0055"	.004" - .008" Bigger than top ring	Min..015"

## CP-CARRILLO CYLINDER HONING RECOMMENDATIONS

\*A torque plate must be utilized for boring and honing\*

### GAS NITRIDED, CPN, CPN2 AND R8GNHD PISTON RINGS

To identify a gas nitrided top ring the entire ring will be a light gray. These instructions must be followed for maximum ring seal. A torque plate must be used unless the bolt holes are not part of the cylinder. The first stone is a 525 (220 grit) stone, done until there is .001" left from final bore. The bore must be round to .0002", checked 360 degrees from the bottom to the top of the bore. Then switch to a 625 (280 grit) stone, 50% load until .0002" is left from final bore. Then use the 625 stone at 20% load to final bore size.



$$Rz = 59 - 138 \mu\text{in} [=1.5 - 3.5 \mu\text{m}]$$

$$Ra = 15 - 35 \mu\text{in} [=0.4 - 0.9 \mu\text{m}]$$

35-40 degree - crosshatch

### DUCTILE MOLY RINGS & PVD

To identify a moly top ring look for a silver-grey plated finish with black phosphated top and bottom surfaces. If there is a dot on the flat side of the ring, make sure it faces up. Rough hone cylinders to within .003, intermediate hone to within .0005 with 220 grit and final hone with a 400 grit and a 10 to 12 RA finish with a 20° to 22° crosshatch.

### CHROME RINGS

To identify a chrome top ring the face will have chrome plating, the top and bottom of the ring will be a reddish-brown. Chrome on any of the rings is not advisable with nikasil bores. These instructions must be followed for maximum ring seal. A torque plate must be used unless the bolt holes are not part of the cylinder. The first stone is a 525 (220 grit) stone, honed until there is .001" left from final bore. The bore must be round to .0002", checked 360 degrees from the bottom to the top of the bore. Continue with a 525 (220 grit) stone, 50% load until .0002" is left from final bore. Then use the 525 stone at 20% load to final bore size.

### DIESEL PISTON RINGS

1. Minimum ring end gaps are as follows:
  1. For wet Cast Iron block: Tops are Bore X 0.007" 2nds are 0.010" to 0.015" bigger then top ring end gap, oils should be 0.009" or more and do not file a 2pcs oil ring.
  2. For filled or solid blocks: Tops are Bore X 0.008" 2nds are 0.015" to 0.020" bigger then top ring end gap, oils should be 0.009" or more and do not file a 2pcs oil ring.
  3. Over 2000hp add 0.001 to the above formulas

### ALL RINGS

The honing must be done slow to minimize heat build-up. No hand honing. Final bore needs to be less than plus or minus .0002" out of round, checked 360 degrees around the bore from the bottom to the top of the cylinder. This should be checked with a dial bore gauge. The expertise of your machine shop is critical to the proper finish on your block bore. When you receive the block back from the machine shop it will appear clean, the block still needs to be cleaned. There could be material trapped in the honing grooves of the block that are not visible. Failure to clean the block could lead to premature ring wear and blow-by.