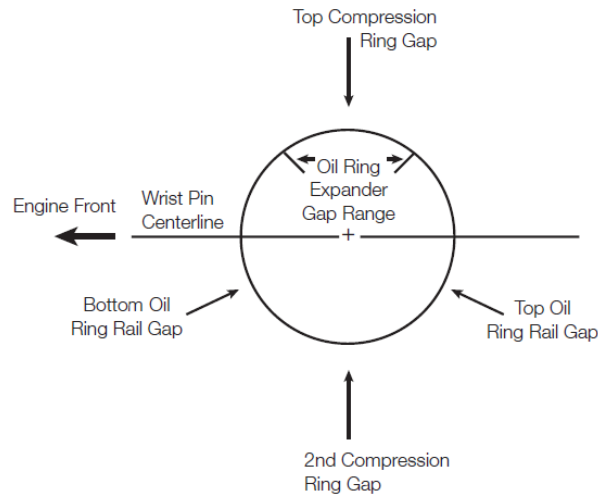


PROPER RING ALIGNMENT



Due to the nature of performance applications, this information should not be considered absolute. Final decisions concerning the installation and use of these products is ultimately the responsibility of the customer.

WARNING: Tight ring gap clearances may cause major engine damage.

WARRANTY DISCLAIMER

Due to the nature of performance applications, the parts sold by MAHLE Motorsports, Inc. are sold without any express warranty or any implied warranty of merchantability or fitness for any particular purpose. MAHLE Motorsports shall not, under any circumstances, be liable for any special, incidental or consequential damages, including, but not limited to, damage or loss of property or equipment, loss of profits or revenues, cost of purchased or replacement goods, or claims of customers of the purchaser which may arise and/or result from the sale, installation or use of these parts. MAHLE Motorsports, Inc. reserves the right to make product improvements or changes without notice and without incurring liability with respect to similar products previously manufactured. These parts are designed primarily for off-highway use. Check State and Federal laws and emission regulations.

Additional tech information and informative technical videos covering the above points are located on our website as well as the MAHLE Motorsport YouTube channel.



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IMPORTANT INFORMATION PLEASE READ

We appreciate your purchase of MAHLE Motorsport Rings.

Please take a minute and read this information sheet before you begin installing your new rings. It is packed with helpful information and tips to help you get maximum performance and reliability from your purchase.

At MAHLE Motorsport our top priority is customer satisfaction. While this sheet is designed to answer the most common questions, don't hesitate to give us a call with your specific questions.

PISTON RING GAPS The rings should be checked in the cylinder to ensure that the end gaps are sufficient. Drop in ring sets typically require no adjustment to end gaps, but MAHLE recommends that the rings be checked for minimum end gap. File fit rings require individual gap adjustments to the top and second rings. This allows you to set the ring gap precisely to your exact needs. The ring should be square in the bore, approximately 1 inch (25.4mm) down from the deck. Measure the end gap with a feeler gauge or other measuring device. Should you require additional ring end gap, the rings should be gapped before installation on the piston.


PROPER RING FILING The ring gap should be filed using the proper ring gap filing tool. Ring gap should only be filed in an inward direction and square to the ring sides. The following chart gives suggested **minimum** ring end gaps for various applications. If running aggressive boost or nitrous applications it may be necessary to increase end gaps.

(888) 255-1942


Application	Top Ring (minimum)	Second Ring (minimum)	Oil Ring Rail	4.000 example Top, 2nd, Oil Rails
High Performance Street - NA	Bore x 0.0045"	Bore x 0.0050"	Min 0.015"	0.018", 0.020", Min 0.015"
Circle Track, Drag Racing - NA	Bore x 0.0050"	Bore x 0.0060"	Min 0.015"	0.020", 0.024", Min 0.015"
Nitrous up to 200hp (25HP/cyl)	Bore x 0.0060"	Bore x 0.0060"	Min 0.015"	0.024", 0.024", Min 0.015"
Nitrous Race 200hp+ (25HP/cyl)	Bore x 0.0070"	Bore x 0.0070"	Min 0.015"	0.028", 0.028", Min 0.015"
Turbo / Supercharger	Bore x 0.0060"	Bore x 0.0060"	Min 0.015"	0.024", 0.024", Min 0.015"
Turbo / Supercharger Race	Bore x 0.0070"	Bore x 0.0070"	Min 0.015"	0.028", 0.028", Min 0.015"
Diesel - Turbocharged	Bore x 0.0060"	Bore x 0.0055"	Min 0.015"	0.024", 0.022", Min 0.015"

NOTE: The second ring gap recommendations have continued to change over the years. Current recommendations are such that the 2nd ring gap is larger than the top rings for most applications. Testing has proven that a larger second ring gap increases the top ring's stability allowing for a better seal. This larger "escape" path prevents inter-ring pressure from building up and lifting the top ring off the piston allowing combustion to get by. Many engine builders have reported lower blow-by and horsepower gains at the upper RPM ranges with the wider second ring gaps. Also, almost every new car made is using this inter-ring pressure reduction method to lower blow-by and emissions and to increase engine output. Additionally, and for these reasons, these ring gap recommendations are to be considered minimums, and some kits will come with larger gaps than the minimum listed in the table directly out of the box.

PROPER RING INSTALLATION

Top ring: If there is a dot (pip mark) or a laser etching (commonly etched as "TOP" or the MAHLE  logo, or a number designator) on one of the flats of the top ring, this marking is indicating the top of the ring. Typically, if there is a bevel on the ID of the top ring, the bevel should be facing up toward the top of the piston.



2nd Ring: If there is a dot (pip mark) or a laser etching (commonly etched as "TOP" or the MAHLE  logo, or a number designator) on one of the flats of the top ring, this marking is indicating the top of the ring. Typically, if there is a bevel on the ID of the 2nd ring, the bevel should be facing down toward the bottom of the piston. Any marking indicating the top of the piston ring supersedes the location of the ID bevel of the ring.



Oil Ring - may be either 2 piece or 3 piece design:

2 Piece Instructions: Remove the coil spring from the oil ring and place the coil spring in the groove, noting the location of the coil spring joint. Install the oil ring in the ring groove; the oil ring gap must be assembled opposite (180 degrees) to coil spring joint.

3 Piece Instructions: Place the expander in the groove, ensure the ends are butted against each other. Position the expander ends in the desired orientation on the piston, an image of the recommended installation location is provided in the Proper Ring Alignment section. Install the lower steel ring, the ring end gap must be approximately 90° to 120° left from the expander edges. Install the upper steel ring observing the same distance for the right side. After ring installation, check if oil ring set can move freely without binding. Important: expander ends must not overlap.

