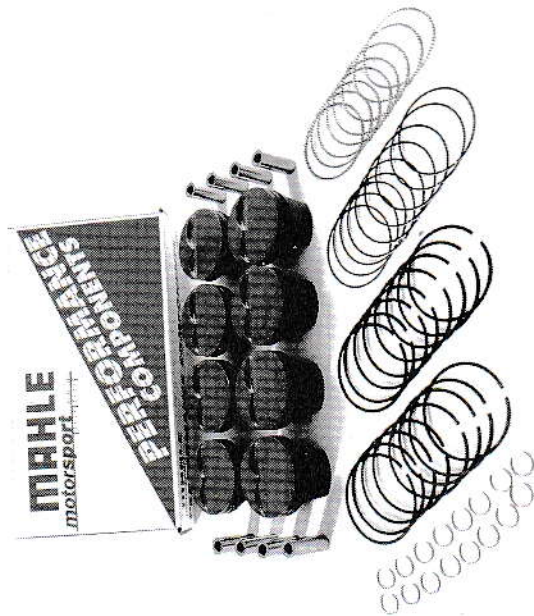


MAHLE PowerPak



Easy to Use

Maximum Power

Proven Reliability

MAHLE
Powering Winners
For Over 95 Years

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 pistons are designed primarily for off-highway use. Check State and Federal laws and emission regulations.

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IMPORTANT INFORMATION PLEASE READ

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

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

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Let's Get Started

Check the contents of the box carefully before you begin. You should have (1) piston, (1) pin and (2) round wire clips for each cylinder in your engine. You should also have sufficient piston rings to equip each piston. If any of these items are missing or damaged, give us a toll-free call at (888)255-1942.

Piston to Wall Clearance

MAHLE machines the proper piston to cylinder wall clearance into every PowerPak piston. We recommend the cylinder be finished to the exact bore size requested for normal operation. The clearances are referenced in the Application Guide by part number, which can be found on www.mahlemotorsports.com. Severe duty applications such as drag race, nitrous, forced induction, filled blocks or endurance racing may require an additional .001-.003" clearance. *Just remember that a little loose is always better than a little tight in most extreme performance applications.*

Valve to Piston Clearance

Valve to piston clearance depends on many factors including the piston dome configuration, valve train and camshaft characteristics and cylinder head design. The minimum recommended valve to piston clearance is 0.080" INT, 0.100" EXH and 0.050" radial-ly. After the camshaft is "degreed" correctly you may check the valve clearance using either modeling clay or light spring method.

Piston to Head Clearance

Proper piston to head clearance is essential to compensate for both thermal and centrifugal expansion of the piston/rod assembly. The recommended clearance for a steel connecting rod is .040" and for an aluminum rod .060" including both deck clearance and compressed head gasket thickness.

Example: If the compressed head gasket is .025" thick and the deck clearance is .015" then the overall piston to head clearance is .040".

Piston Dome to Cylinder Head Clearance

Due to the increasing variety of cylinder heads available today, we recommend that you check the piston dome to cylinder head clearance. Modeling clay may be used for this check with the recommended clearances being 0.040" for a steel rod and 0.060" for an aluminum rod. ***Under no circumstances should the piston dome to head clearance be less than the piston to head clearance!***

Notice: Be sure to check the clearances of MAHLE pistons in relation to other engine components such as valves, connecting rods, and oil squirters, **BEFORE** running the engine. These components may need

adjustment in order to function properly with MAHLE pistons.

Oil Support Rails

With short pin height locations, an oil support rail may be required. Install the support rail with the "dimple" facing down and positioned inside the opening above the pin.

Piston Modification

MAHLE Motorsports has designed these pistons to work "as delivered" in most applications, and we do not recommend modification of the pistons. Should modifications be necessary there is no adverse effect if the phosphate surface coating is removed from modified areas.

NOTE: Care should be taken not to damage the Grafal® skirt coating.

Cleaning

Once you are satisfied the pistons have proper clearances, they should be thoroughly cleaned prior to final assembly.

Final Assembly

Care should be taken to keep the parts as clean as possible during final assembly. Any foreign material on the pistons/rings could lead to engine damage and/or less than peak performance.

Pin/Rod Clearance

Proper pin to rod clearance should be insured prior to piston/rod assembly. Proper clearance depends on many factors and should be based on the rod manufacturers recommendations.

Installing Round Wire Clips

The round wire clips can be easily installed by placing one end into the clip groove in the piston. Take a flat blunt tool (such as a small screw driver) and "walk" the clip into the groove. Make sure the clip is totally seated into the groove.

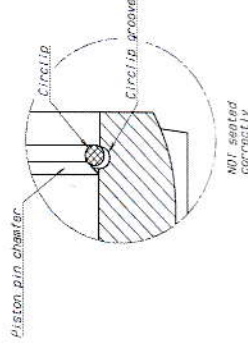
WARNING: Under no circumstance should the clip be squeezed or compressed with pliers or other tool as this may result in the lock failing to operate properly.

Important Notice

It is very important and critical for sustained durability that the "round wire locks" are properly seated in the lock groove of the piston.

The following is the recommended procedure for proper seating: **1.** After placing the first round wire lock in the groove (caution: do not collapse the lock using pliers- instead gently work the lock into the groove with a blunt edge tool) place pin in the piston and gently tap the **piston** against the previously installed wire lock using a wooden or plastic dowel. **2.** Upon final assembly of piston, pin, connecting rod, and remaining lock, repeat the seating process on the newly installed lock.

The resulting piston pin end clearance when properly seated should approach .020" / .025" max.



Checklist for Success

Have you checked the following: 1. Piston to Wall Clearance 2. Valve to Piston Clearance 3. Piston to Head Clearance 4. Piston Dome to Head Clearance 5. Pin to Rod Clearance 6. Clips Installed Correctly 7. Ring End Gap

Final Thought

Prior to final engine assembly, the top, bottom and face of each ring plus the cylinder bore should be *lightly* coated with clean, light-weight, conventional motor oil. **Do NOT dip the entire piston assembly into the oil as this may lead to improper seating of the rings.**