



# INSTRUCTIONS

## FOR PROPER INSTALLATION OF ROSS FORGED ALUMINUM AUTOMOTIVE PISTONS

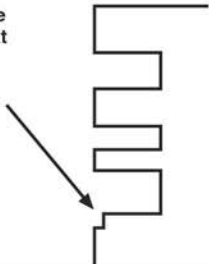
**IMPORTANT:** Before balancing these pistons, be sure they are as you ordered. Used or altered parts can not be returned for refund, credit, or exchange regardless of the circumstances. In the event that your pistons are not as ordered, contact the factory immediately as all credits, exchanges, or repairs must be completed within 45 days of purchase. All parts returned for credit must be in like new condition-no scratches, dings, or nicks.

### **BORE SIZE AND CLEARANCE**

Before you attempt to set clearance of piston skirt to cylinder wall you must first determine which skirt design your pistons have. Failure to do this can result in piston scuffing, excessive oil consumption, or a seized engine.

To determine which clearance instructions to use from this instruction sheet, compare the lower sill of the oil ring groove of your piston to be fitted against the illustrations below.

If the piston to be fitted has a step at this corner use instructions "A" on this sheet.



If the piston to be fitted has a radius at this corner use instructions "B" on this sheet.



### **INSTRUCTIONS "A"**

Check piston diameter at the point indicated on drawing. Although the piston skirt to the cylinder wall clearance preferences vary somewhat among engine builders and designers, we recommend the following minimum clearances for our pistons. THE FOLLOWING RECOMMENDATIONS ARE FOR OUR STANDARD DESIGN PISTONS FORGED FROM 2618 T-61 ALUMINUM. FOR MARINE APPLICATIONS ADD APPROXIMATELY .001 CLEARANCE TO THE BELOW CLEARANCES. MANY SOLID (WATER JACKETS FILLED) BLOCKS AND AIR COOLED ENGINES WILL REQUIRE ADDITIONAL CLEARANCE AS WILL ENGINES WHICH HAVE BEEN HONED WITHOUT TORQUE PLATES.

Blown gas street.....	.010
Blown fuel & blown gas competition .....	.012 to .014
Normally aspirated street cars .....	.007
Blown alcohol.....	.011
Modified type engines, including drags, circle track and road race .....	.008 to .009



SET CLEARANCE AT BOTTOM SILL OF SIDE RELIEF

## INSTRUCTIONS "B"

Check piston diameter at the point indicated on drawing. Although piston skirt to cylinder wall clearance preferences vary somewhat among engine builders and designers we recommend the following minimum clearances for our pistons. THE FOLLOWING RECOMMENDATIONS ARE FOR OUR STANDARD DESIGN PISTONS FORGED FROM 2618 T-61 ALUMINUM. MANY SOLID (WATER JACKETS FILLED) BLOCKS AND AIR COOLED ENGINES WILL REQUIRE ADDITIONAL CLEARANCE AS WELL AS ENGINES WHICH HAVE BEEN HONED WITHOUT TORQUE PLATES. AIR-COOLED ENGINES WITH PLATED OR SLEEVED ALUMINUM CYLINDERS MAY REQUIRE LESS CLEARANCE.

Normally aspirated street cars

Bore size 3.475 and under ..... .003

Bore size 3.476 - 4.499 ..... .004

Bore size 4.500 and above ..... .006

Modified type engines, including drags,

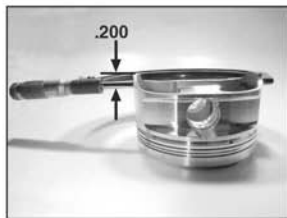
circle track, and road race ..... .004 to .005

Turbo engines, small bore ..... .006

Marine applications add ..... +.002

Nitrous over 250 hp V-8 add ..... +.002

Nitrous over 100 hp 4 cyl add ..... +.002



*All dimensions in this instruction sheet are for 74 degrees Fahrenheit temperature. Keep in mind that aluminum expands with heat and contracts with cold.*

**VALVE POCKET DEPTH:** Minimum acceptable valve to piston clearance is dependent upon many factors, including cam lobe lift rate, valve spring tension and valve actuation mechanism weight, etc. However, we have found that .090 intake and .110 exhaust clearance are sufficient in most instances, check valve to piston clearance (using either clay or the light spring method) making sure the camshaft is degreed as it will be operated, as a few degrees of advance or retard at the camshaft can radically alter the valve to piston clearance.

### **PISTON TO COUNTERWEIGHT CLEARANCE:**

A minimum of .060 is acceptable. Check rod pin end to piston pin boss side clearance with the piston in the bore and the rod installed on the crankshaft, to insure that the side of the rod is not contacting the side of the piston pin boss.

**RING SIDE CLEARANCE:** Check ring side clearance with feeler gauges to be sure that it is between .001 and .004.

### **RING END GAP:**

Use the ring manufacturers recommendations.

**CLEANLINESS:** Scrub pistons and cylinder walls in hot soap and water before installing. We recommend brushing a light coat of non-detergent oil on pistons skirt and cylinder walls for initial lubrication. DO NOT use detergent oil, synthetic oil, or an additive until the rings have seated. Be sure to lubricate pins with lubriplate, or an assembly oil to prevent galling on initial fire-up. Check forced pin oilers for foreign matter.

When at all possible, use a moly top ring rather than chrome plated rings. Chrome is a weldable material with very little surface porosity. This can lead to premature cylinder wall wear and scuffing, as well as prolonged break in periods.

**OFFSET PINS:** If this set of pistons has pins which are offset (side to side) see separate instruction sheet concerning offset pins.

Spiro Lox installation may be facilitated by grasping each end of the lox and pulling the ends apart a MODERATE (approximately 1/2") amount. This will cause the lock to resemble a small coil spring. The lox can then be "spiraled" into places almost as if you were screwing them into the groove. Be sure that all lox are properly seated and that they exert radial pressure against the lox groove. You should not be able to spin the lox by hand after they are installed. Most Ross Racing Pistons come with double lox (four lox total per piston - two at each end of pin). Be sure that the correct number of lox are installed in each piston.

Many Ross pistons designs have offset domes or valve pockets for certain engines. Check to be certain the pistons are installed in the correct cylinder numbers to ensure that the dome and valve pockets match the combustion chamber and valves.

Many pistons (at the customer's request) are made with hand fit or marginal clearance domes for maximum compression and quench, therefore check dome to head clearance with modeling clay with the spark plug installed.

All Ross stocking pistons come from the factory pin fitted, however, many Ross custom pistons are shipped not pin fitted, as this is an extra cost option. If the customer is going to pin fit the pistons the job should be done on a hone.

**ALL ROSS PISTONS WITH THE OIL RING IN THE PIN HOLE MUST USE EITHER OIL RING SUPPORT RAILS OR PIN BUTTONS.**

**IF THERE IS ANYTHING YOU DON'T UNDERSTAND ABOUT THE ABOVE INSTRUCTIONS CALL THE ROSS TECHNICAL INFORMATION LINE (310) 536-0100**