



GENERAL INSTRUCTION SHEET

NRHS wants *every* customer's project to be a success. We provide what we believe to be the highest quality performance parts available. But to be successful, these parts *must* be installed correctly! Your factory service manual is an indispensable tool, however, high performance parts often require special attention in specific areas. We have listed these areas below. For all other procedures, please follow your factory service manual. If you have any questions, please call (303) 702-1600 and speak with a performance consultant. It's far better and cheaper to avoid a mistake than repair it!

1) Assemble your pistons and rings properly. First, it's *critical* that your rings are gapped properly. Square the ring in the bore and measure the gap with a feeler gauge. Adjust the gap with a ring gapping tool, or *very* carefully with a file (it helps to mount the file in a vise). Take off only a little at a time as you get close to the correct gap so that you don't overshoot and end up with a too-wide gap, this is a common mistake. Also make sure the gap is square, i.e. not "V" shaped or at an angle. Set the gap as follows:

- 3.498" to 3.563" bores: .018" top ring, .018" second ring
- 3.813" to 4.000" bores: .021" top ring, .021" second ring
- 4.125" to 4.250" bores: .023" top ring, .023" second ring
- Oil rings must have a gap of between .015" and .060"

Note that these gaps are for normally aspirated street motors on gasoline. If you need ring gap numbers for other applications, please call. Too tight of a gap will damage the cylinder wall or worse, so if in doubt, go a little bigger. Once the correct gap is achieved, *be sure to thoroughly deburr the filed area from all directions before installation onto the piston!* Burrs will cause the ring to hang up in the ring lands and burrs on the outside edge can actually score the cylinder wall. Nikasil cylinders are particularly sensitive to this! Finally, install the rings onto the pistons using a ring expander tool, taking care not to scratch the piston. It's *critical* that the correct ring (top or second) is placed in the correct ring land with the correct orientation! This is a common mistake that often results in excess oil consumption. The packaging will indicate the correct way to install the rings. If your rings are provided without packaging, the ring with the moly coating on the outside is the top ring and the uncoated ring is the second ring. If the ring is marked, the mark goes *up*. If the ring is unmarked, look for a bevel on the inside edge. That bevel goes up if it's a top ring, down if it's a second ring. If the ring has no mark and no bevel, it can be installed either way, but make sure it's in the correct ring land. If using a nik-a-sil cylinder, thoroughly lubricate the piston skirt, cylinder wall, *and the rings* before assembly. We recommend Red Line assembly lube, available from NRHS. The first few minutes of the Nikasil's life is critical and a lack of lubrication during this time will damage the plating. If using a cast iron lined cylinder, a thin coating of lubrication on the skirt and cylinder wall is all that's needed.

2) Check piston to piston clearance. With bolt-on engine kits (i.e. 1050/1250 XL/Buell kits, 98 inch Twin Cam kits, 85 inch Evolution Big Twin kits) this generally won't be a problem, although it doesn't hurt to give it a look. With big bore kits that require case boring and/or stroker kits, however, it is *extremely important* to check. Large bores and

