Manufacturers of Cylinder Sleeves Since 1945

2-STROKE BREAK-IN PROCEDURES

1. Start your engine and let it idle, occasionally blipping the throttle for four to five minutes. Allow the engine to cool completely. Repeat this *heat cycle* process four more times.
2. Warm up the engine again and ride the bike for five to seven minutes at a very easy pace. Vary the rpm, and do not ride at one speed. Do not ride at more that 1/3 throttle or more than 1/3 rpm. Let the engine cool down completely and repeat the initial break in ride. Let the engine cool down.
3. Check the base and head nuts for proper torque. Check the coolant level and add coolant as necessary.
4. Ride the bike for five to ten minutes at a moderate pace. Vary the rpm, and do not ride at more than ¾ throttle or more than ¾ rpm. Then let the engine cool completely and repeat this secondary break-in twice more.
5. Replace the spark plug with a new one. Ride the bike for five to eight minutes at a moderate pace. Vary the rpm, and shift up and down gears. Once the engine is up to operating temperature, you can make a jetting pass. Start in second gear and ride at full throttle through fourth gear, fully revving out fourth gear. With the throttle wide open in fourth hold the kill button down, pull the clutch, and stop. This is called a *plug chop*.
6. Read the spark plug. With a pocket flashlight and a magnifying glass, look at the porcelain part of the plug only. As you view the plug from the center electrode, look down on the length of the porcelain to its base. There should be a dark chocolate colored smoke ring. There was not sufficient time to thoroughly color the whole plug, so the nose of the insulator may still be white. As long as there is a visible dark ring at the base, everything is OK. Remember, we want break-in jetting, so the plug should read rich/dark. Richen the jetting as necessary. If you are having a hard time reading the spark plug, follow the proceeding steps: Put the plug in a vice, and hacksaw around the plug at the washer. Break the threads off with vise grips and the porcelain will be easy to read.
7. Complete the break-in by riding at an aggressive pace for fifteen minutes. Vary the rpm and do not cruise at part throttle. Ride hard without revving the engine too high. At the end of this final break-in session do another jetting pass/plug chop as described above. Check the spark plug for the correct dark/rich condition. Wiseco piston equipped engines will require another one or two break-in cycles. If your engine is equipped with a Wiseco piston, continue with the following steps: Ride at a recreational pace not revving the engine hard. Full throttle should only be used for very short periods. Fifth and sixth gears should only be used to cruise. Ride one tank of gas through the engine in this manner to complete the break-in.
8. Replace the spark plug with a new one. Ride the bike aggressively for eight minutes and do a jetting pass/plug chop in fifth gear. If the porcelain color is still dark/rich, lean the main jet size one at a time until the smoke ring at the base of the porcelain is a light brown. If the porcelain base is white, do not run the engine and contact L.A. SLEEVE. If the plug color looks good, continue riding at a race pace for ten minutes. Stop and let the engine cool. Check the torque on the cylinder base and head nuts.
9. More on jetting: If you generally run your engine flat out in sixth gear, then make your jet pass/plug chop in sixth. Motocross jetting is checked in fifth gear, therefore it is not safe to run MX jetting in the desert wide open in sixth. Desert jetting is richer than MX jetting. When running an engine at full throttle for extended periods, be sure to chop the throttle decisively to slow down. Just rolling out a little can seize a well-jetted engine.

Remember, the best top-end overhaul, done by the most qualified mechanic, is only as good as your break-in procedure. Good luck!

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4-STROKE BREAK-IN PROCEDURES

L.A. Sleeve sizes it's cylinders to extract maximum horsepower. Due to this, it is necessary to run your motor through a break-in process. Four stroke motors also need to have the rings seat. If you do not allow the rings to seat you may experience excessive smoking. Use petroleum product for break-in. Do not use synthetic oil. We recommend using Diesel engine oil RPM Delo 400 15/40 or Shell Rotella T 15/40. After break-in, we suggest you use Kal Gard Pro Comp 4 10W40 synthetic lubricant.

1. When setting up the motor to start the break-in process, set up two fans, one from the front and one blowing across the exhaust head pipe.
2. We recommend running the main jet two sizes larger and the needle clip one richer (one position down raising the needle) than normal through the first tank of fuel.
3. Set your motor at a high idle about 2000 RPM's and run the motor for about fifteen minutes straight without shutting it off. Do not whip the throttle or vary the RPM's. After fifteen minutes, shut the motor off and let it cool completely. Repeat this cycle one more time. We like to heat cycle the motor several times before riding. Next, with the fans set up, start your motor and run for about 10 minutes (run the RPM's from 1500 to about 3500). Don't be alarmed when doing this; it is normal to see the head pipe glow red.
4. The first ride should be easy not to exceed half throttle or half RPM's (about 4500), ride for about ten to fifteen minutes like this. Through the break-in process, never run your motor at a constant RPM for longer than 100 yards. You should be accelerating or decelerating. This does make it hard to break-in the motor on a flat road, as you may have a tendency to cruise down the road. It's just easier to ride off road where you can accelerate or decelerate. Let the motor cool completely before riding again.
5. The next ride you can go up to ¾ throttle and ¾ RPM's. After that, for the next ride and balance of the first tank of gas, you can go to full throttle but do not rev out the motor, short shift at about ¾ RPM.
6. Jetting needs to be checked after you run the first tank of fuel through the motor. You should not have to run the motor hard enough during the first tank of fuel for jetting to be critical.
7. Replace the spark plug with a new one. Ride the bike for five to eight minutes at a moderate pace, vary the RPM and shift up and down the gears. Once the engine is up to operating temperature you can make a jetting pass. Start in second gear and ride at full throttle through fourth gear, fully revving out fourth gear. With the throttle wide open in fourth, hold the kill button down, pull in the clutch and stop. This is called a "plug chop".
8. Read the spark plug. With a pocket flashlight and a magnifying glass, look at the porcelain part of the plug only. As you view the plug from the center electrode, look down the length of the porcelain to its base, at this point there should be a dark chocolate colored smoke ring. There was not sufficient time to thoroughly color the whole plug, so the nose of the insulator may still be white. As long as there is a visible dark ring at the base, everything is fine. Remember, we want break-in jetting so the plug should read rich/dark. Richen the jetting as necessary. If you are having a hard time reading the spark plug, after the jet pass put the plug in a vice and hacksaw around the plug at the washer. Break the threads off with vise-grips, and the porcelain will be easy to read.
9. We recommend you re-torque your head and check or re-set your valve clearance after the second tank of fuel.

Cylinder Head Torque Spec.

- Raptor 660 Cylinder 30 ft lbs 7 ft lbs on Allen bolts, Cylinder 27 ft lbs and 7 ft lbs on rocker cover bolts.
- Raptor 700 25 ft lbs on bottom bolts.
- LTZ/KFX/Arctic Cat 400/440/453 kit 33 ft lbs and 7.0 on 6mm bolts
- YFZ450 35-38 ft lbs and 7.0 on 6mm nuts
- TRX/CRF450R 40 ft lbs
- 400EX cylinder head nuts 33ft lbs and valve cover bolts 8mm 17 ft lbs
- 250F'S 35 ft lbs

Cylinder Break In

Installation Instructions

Your cylinder has been sized to extract its maximum potential. Because it has been fitted with close tolerances, a very important break in procedure is required. This is critical to increase performance without sacrificing reliability. Follow these guidelines closely and use the checklist to ensure that break in is completed in full.

1) After receiving your cylinder from L.A. Sleeve, inspect it for any freight damage. If there are any questions, contact L.A. Sleeve immediately.

2) Wash your cylinder and piston with dish soap and hot water. Scrub the cylinder bore with a towel until the towel remains clean. Dry the parts immediately and spray the cylinder bore with a liberal amount of WD-40. Use a dry towel to spread the oil evenly throughout the cylinder.

3) L.A. Sleeve recommends that you install new reeds and a new wrist pin bearing at this time. Do not leave anything to chance. If a part is possibly worn out then replace it.

4) Put a couple of drops of 2-stroke oil on the wrist pin and pin bearing and install the piston. The arrow on the piston crown faces the exhaust port (except the LT-80). If there is no arrow, the ring locating pins will face the intake port. Double check that the circlips are firmly seated in their grooves. Install the piston rings with the numbers up. The numbers are located at the ring end gap. Be sure the ring end gaps are aligned with their respective anti-rotation pins. If installing a tapered ring into ring groove, the flat side faces down.

5) Assemble the cylinder with new gaskets; do not use any type of gasket sealer. Do not put any more oil on the piston or cylinder. The WD-40 left in the bore is enough lubricant. Compress the rings with one hand as you slide the cylinder down onto the piston. Look through the intake window to check the alignment of the ring end gaps over the pins. Adjust the rings with a small screwdriver as necessary. If the ring end gaps are not centered over the pins, you may break the rings if you force the cylinder down. Take your time. Torque the base nuts to the factory specs, install the head, and torque the nuts to the factory specs.

6) Install the intake and exhaust systems with new gaskets. We suggest using orange high temp silicone on the exhaust flange. Install the water hoses and fill the cooling system with glycol based coolant mixed 50/50 with distilled water.

7) Install a factory recommended spark plug.

8) Richen the jetting in the carburetor, up two sizes on the main jet and one clip position on the needle. L.A Sleeve recommends using **ELF** 2-stroke engine oil at 32:1 for break in. After break in procedure is complete, you run may **ELF** oil at 40:1.

L.A. SLEEVE
Manufacturers of Cylinder Sleeves

NiKS PROX
POWER-PRODUCTS BY L.A. SLEEVE

CYLINDER SLEEVE INSTALLATION PROCEDURE

Step 1. The cylinder must be stripped of all removable parts: studs, nuts, bolts, manifolds, etc.

Step 2. The cylinder is bored out to accept the sleeve. When the sleeve is installed into an all aluminum cylinder, the interference fit is .004. When the sleeve is being installed into a cast iron cylinder bore, the interference fit is .002 to .003.
The interference fit is determined by measuring the outside diameter of the sleeve, then boring the cylinder diameter smaller than the sleeve.
The interference fit is a critical aspect of sleeve installation because this step insures that the sleeve does not move when in the cylinder. Also, proper interference fit is important for cylinder cooling purposes.

Step 3. The cylinder is then heated in an oven between 400º, up to 450º for an hour or more.
Do not use a torch or hot plate for this procedure. It is important that the cylinder heats uniformly.

Step 4. The cylinder is then removed from the oven and the sleeve will drop easily into the cylinder.
Turning the sleeve by hand to line up the ports is a common practice, or you can use a needle nose type device to align the ports.
You will have between five and ten seconds before the sleeve and cylinder lock up.

Step 5. The cylinder must then be put under a hydraulic press to keep the sleeve from rising while the cylinder is cooling.

Step 6. The ports of the sleeve must then be blended with the cylinder by using an assortment of hand grinding porting tools. Mismatched ports will cause some power loss to the engine.

Step 7. After the ports have been matched, the cylinder (sleeve) must be bored out and honed to insure proper piston clearance.
Measure your piston at the skirt to properly bore the sleeved cylinder to the correct bore size.
Chamfer the edges of all the ports to prevent the rings from catching on a sharp edge.

Next, hone your cylinder to the correct piston clearance.
Properly sleeved cylinders can use the O.E.M. recommended piston clearance. If you have a doubt, add a half thousandth (.0005) to the clearance.

Step 8. As an added finishing touch, surface decking the top of the cylinder is recommended in order to make sure that the head gasket will sit flat on the cylinder to create a good sealing surface.

Make sure you only take the minimum cut off the top of the cylinder.