



IMPORTANT!!

INSTRUCTIONS FOR INITIAL START-UP AND HEAT CYCLING

Please Read Before Starting Your Engine!

After careful assembly of your new engine, follow these important steps during initial start-up. This is NOT the same procedure as starting up an engine after performing a top end rebuild with O.E.M. parts.

- **Make sure you have oil flow to the rocker arms.** Milwaukee-Eight® and Twin Cam® engines pressurize the oil first, then runs it through the oil filter before it starts to lubricate any critical engine areas. The very last parts to see oil are the cylinder heads; coincidentally, the heads are quick to generate heat and need oil for lubrication and to carry heat away from these critical areas. Be sure to fully fill your new oil filter before installing to speed up the process.
- **For this reason, we highly recommend using SPECTRO Motor-Guard Roller Tappet Break-in motor oil for priming and initial fire-up.** You will likely use a couple of quarts of Spectro Motor-Guard break-in motor oil as supplemental lubrication that you will also apply with a hand pump oiling can.
- During assembly, with a new oil filter in place, prime the lower end with **Spectro Motor-Guard Break-in oil.**



036-665

Leave the rocker cover lids off!

Our procedure is to start the engine without rocker lids on to verify steady oil flow before sealing the rocker lids (keep an oil can handy to squirt oil on the valve stems, valve springs, and rockers until oil is present through the rocker arms).

Remember, on a freshly assembled engine, oil will have to travel from the oil tank, through the oil pump, outside of the engine to fill the oil filter, back into the engine where the cam plate distributes it to the crankshaft and piston oil jets, fills the lifters and pushrods, then finally to the rocker arms, valve stems and valve springs.

Priming everything (filter, pushrods, etc) helps speed this process, but it still takes a long time to purge air from the system and oil to reach all critical areas. Without this initial oil flow, valve and guide seizure can occur, ruining your new machine work and parts.



Before starting the engine, cycle it in short 10 second bursts using the starter with the spark plugs out but grounded. Add several squirts of **Spectro Motor-Guard Break-in oil** on the valve springs, rockers, and valve stems during these non-firing cycles with the pump oiler can before and during each of the 10 second "non-firing rotation" cycles. Watch for bubbles, then oil flow through the ports and channels on top of the rocker arms shown above in the red circles.

CONTACT OUR TECH LINE AT ANY POINT IN THE FOLLOWING PROCEDURES IF YOU HAVE QUESTIONS: productsupport@zippersperformance.com

Over for Heat Cycling Steps ->

*******With the rocker covers still removed, begin the “Heat Cycle” process*******

Remember: New parts don't die....they are murdered! The absolute worst thing you could do is start a fresh engine and let it idle, while you kick back and watch it melt from the inside out.

- **Start the engine in short stages (heat cycles).** Perfect piston fit is a critical factor for engine performance and long engine life. An incredible amount of heat is generated between the rings, pistons and cylinders during initial start-up. It is at this point where clearances are the tightest and your rings, pistons and cylinders will meet for the first time. Follow the instructions below and you'll be rewarded with an engine that will last longer and perform better.

Continue to provide supplemental lubrication as previously described to the valve stems, rockers, and springs.

DO NOT ESTIMATE TIME - USE THE STOPWATCH FUNCTION ON YOUR PHONE IN THE NEXT STEPS

- 1) **1st, 2nd, and 3rd fire-ups:** These are very short run times! Each of these initial 3 start-ups should last only ten (10) seconds each at 1250 - 1500 rpms (just above idle speed). After each start-up, allow the cylinders to fully cool (use a fan) to room temperature. Don't rush it. Take your time. Your new parts need to get acquainted.
- 2) **4th, 5th and 6th fire-ups:** Run times increase slightly. Run these 3 start-ups at 1250 - 1500 rpms, 30-45 seconds each, with time to cool with a fan to room temperature between each run. Each run should heat up slower than the last; this is normal.
- 3) **7th and 8th fire-ups:** With a fan blowing air at the engine, increase run times to 1-2 minutes each, again at 1250 - 1500 rpms. Allow cooling with the fan blowing on the cylinders to room temperature between runs, as before.

If you don't see pumped oil at the rockers at this point, STOP and reevaluate your assembly.
Re-install the rocker cover lids only after you have verified oil flow through all 4 rocker arms.

Next 2 runs: No more than 2 to 3 minutes each. Continue to use a fan, but don't neglect the cooling period. These first few minutes of run time are critical to establish cylinder and piston wear patterns and to protect the rings from overheating and tension loss.

- 4) **Now you can start the break-in process while riding the bike.** Make your first rides short ones, with adequate cooling stops along the way. Don't lug the engine and avoid stop-and-go traffic since heat is the enemy of a new engine.
- 5) Pick a route that will allow you to ride at moderate variable engine speeds(2000rpm-3200rpm), while shifting through the rpm range. Keep rpm levels moderate and variable; avoid constant engine rpm levels, increase them gradually as you log on the miles.
- 6) **Continue to use the Spectro Motor-Guard Break-in Oil for the first 500 miles.** We recommend changing the oil at 500 miles with **full synthetic Spectro Heavy Duty Platinum 20w50** motorcycle engine oil,
- 7) Zipper's recommends High ZDDP **SPECTRO Motor-Guard Break-In Oils** (pn.036-665) and **SPECTRO Heavy Duty Platinum 20w50** (pn.036-125) full synthetic motor oil for their superior level of protection and stability in an air-cooled H-D® engine during the break-in process.



Then at 2,000 miles once again change the motor oil with the synthetic **20w50** motorcycle engine oil of your choice. The break-in process is now complete. **We recommend either Spectro Heavy Duty Platinum 20w50 synthetic (pn.036-125) and Red Line Synthetic Motorcycle 20w50 (pn.084-205).**

NOTE: ZDDP is a sacrificial chemical oil additive that prevents excess wear on adjoining moving metal engine parts in an engine. It is consumed in the break-in process while protecting those parts. This additive is rarely found in EPA restricted oil formulations for passenger cars, light trucks, and motorcycles. **Spectro Motor-Guard Break-in Oils** have around 2000ppm of ZDDP and the 100% synthetic **Spectro Heavy Duty Platinum 20w50** engine oils average around 1700 ppm of ZDDP.

Since your new engine will generate significantly more power, it will likely realize an increase in operating temperature. A quality oil cooler is also a smart investment and is highly recommended

Thanks for your purchase of our product. We welcome your feedback.

V220108

**Zipper's Performance Products
6655-A Amberton Drive, Elkridge, Maryland 21075 410-579-2828**