

ENGINE BREAK IN PROCEDURE

Ensure all accessories (headers, alternator, power steering pump, etc.) are tight and check for any water /oil leaks. Even if your engine came complete, it's best to check all major components such as Distributor, Spark Plugs, Wires, Carburetor etc as it could have been damaged or disturbed during shipping.

1. You will need to fill the engine with oil as they are shipped dry. Most engines use 5 quarts total, if unsure check with ATK tech for assistance. When installing an oil filter, fill it ½ way with oil and lube the rubber gasket that surrounds the filter with oil, than tighten by hand. We recommend WIX or other premium brand oil filters. We recommend Joe Gibbs Racing Oil BR40 especially in flat tappet engines, if this is not available to you then a 10w30 with an engine break in additive (ZDDP, or ZINC camshaft additive) will do. ATK also recommends running a zinc additive throughout the life of the engine. It is best to prime the oil system with an engine priming tool or a Pre Luber offered by ATK even if the engine has been dyno tested.
2. We recommend that a new engine is first broken in with regular mineral type engine oil with zinc additive. Do not run synthetic oils until 4,000+ miles are put on the engine. If you fail to follow this procedure, the rings may never seat.
3. The distributor timing should be set to a baseline if your engine was dyno tested and came with a dyno report, but occasionally it is disturbed during shipment. If your engine was complete, but not dyno tested you will still need to verify timing. Non Dyno tested engines come set at approximately 34-36 degrees without Vacuum Advance hooked up (must have vacuum port plugged to verify). **DO NOT ASSUME** because it fired up, it is correct. If the engine does not fire immediately you may need to recheck the timing.
4. Set the ignition timing after engine starts. The starting point to set timing for most carbureted engines is 34 degrees before top dead center (BTDC) with the vacuum advance disconnected (must plug vacuum port) and running at 3,000 rpm. Some experimentation with timing is required for optimal results with locally available fuel, but it should be between 32-36 BTDC.
5. Even if your engine came with a carburetor, it may still need to be setup correctly for your application. The engine Dyno is only a simulation, tuning specs change once installed in a vehicle due to different elevations and vacuum accessories are hooked up. Please refer to the instruction manual to properly set the floats, idle speed, and air/fuel mixture screws for optimal performance. See ATK Tips below.
6. Flat tappet hydraulic cams only – Run the engine between 2,000 and 2,500 RPM's, with no-load on the engine for the first 30 minutes. Let the engine cool down completely and repeat process 2-3 more times. **Do not idle the engine for any extended period at this time**, this is critical to break in the camshaft. We have usually performed this step at ATK if the Dyno Test and Tune option was purchased.
7. Roller Cam engines do not need to follow the procedure in step 6.

8. Remember that the cooling system on a fresh engine swap will have a lot of trapped air, which will lead to wild temperature gauge readings and possible water pump cavitations (water pump not moving coolant due to trapped air). To help avoid trapped air in the cooling system, try to fill the cooling system up with a 50/50 mix of quality coolant and water a few hours before you plan on starting the engine. Leave the radiator cap off during this time. We also recommend removing one of the water crossover plugs in the intake while filling the cooling system. This will tend to help purge a fair amount of trapped air before you start the engine. Also helpful during break-in is to use a Lever-Vent type radiator cap on your radiator in so that you can manually purge trapped air while engine is running- (use extreme caution to avoid being burned by hot coolant). Your normal cap can then be re-installed after engine cools off. See ATK Tips below.
9. The worst thing for a new engine is to let it sit there and idle. The engine needs to build up cylinder pressure in order to expand the piston rings and allow them to seat. Failure to properly break in the engine can cause the rings to not seat and produce blow by as well as poor performance. This applies to engines that were dyno tested as well. Drive the vehicle while varying speeds and loads on the engine for the first 200 miles. Occasional full throttle runs from a rolling start (2,000 rpm or so) to 4,500 rpm will help seat the piston rings. After 150-200 miles, it is recommended to check the rockers/valve clearance to ensure adjusters are tight and valve lash is correct (do this again at 500 miles) as well as re-torquing the head bolts and intake manifold bolts. The following two steps are not necessary, but may help speed up the break-in process.
10. After the initial 200 miles run five or six medium-throttle accelerations to about 4500 RPM (observing local laws of course), then letting off in gear and coasting back down to 20 MPH.
11. Run a couple hard throttle accelerations up to about 5000 RPM, then letting off in gear and coasting back down to 20 MPH.
12. After 500 miles are on the engine, change the oil, filter and check coolant level (top off if necessary).
13. Drive the next 500 miles normally, without high RPM's (below 5000 RPM), hard use, or extended periods of high loading. It is best to avoid long periods of idling during this period.
14. Change the oil and oil filter again at 1,000 miles. Continue using mineral oils and zinc additive, until about 4,000 miles. At that point, you should be able to run a quality 10w30 synthetic oil if you choose.
15. All ATK HP Engines require Premium fuel of 91+ Octane.

ATK ENGINE INSTALLER TIPS

PCV: ATK Recommends running name brand PCV valves (AC Delco, Chevrolet Performance or Motocraft) from older high horsepower vehicles. Due to the camshafts used in our engines, 60's muscle cars, or low powered 4 cylinder engines PCV valve will work best. Install the PCV valve in the port at the base of carburetor or manifold port, use PCV hose only, not fuel line. Be sure to have fresh air to the opposite valve cover, through a breather or through the port in the air cleaner. An

incorrect PCV system can cause the engine to burn oil, run rough, have poor performance and cause blow by.

Cooling: We recommend running the OE Fan/Clutch assembly with the fan shroud and a Performance grade radiator. The OE Fan setup produces much more CFM than most aftermarket electric fans and will cool better. If you do decide to swap to an electric fan, look for the most CFM possible with a fan shroud to direct air flow. We often see overheating problems due to customers using low quality electric fans/no shrouds. Overheating is a cooling issue, not an engine issue.

Thermostat: ATK recommends a 180-195 degree thermostat (with bypass holes drilled if you are not running the bypass hose) to properly maintain temperature. Do not run a 160 degree thermostat as this can often allow the thermostat to remain open causing the engine to run hotter and or overheat.

Carburetor: Adjust the mixture screws all the way in and then back out 1 turn. Adjust the idle speed screw to as low as it can be without stalling the engine, then adjust the mixture screws in/out equally until engine idles up the highest, readjust the idle speed down and repeat the process. When no more improvement is evident, reset the idle speed screw to the desired idle RPM (800-1000 rpm). Adjust the choke per carburetor instructions. Recommended fuel pressure is typically between 5-6 PSI for all ATK engine combinations. In some cases you may need to run a fuel pressure regulator, as fuel pumps tend to put out more than 6 PSI and can create tuning issues.

Fuel Injected Vehicles: Vehicles with fuel injection need to have the complete fuel system (Fuel Pump, Injectors, Pressure, Filters, Etc) checked to ensure everything is in good working order **prior to start up**. Failure to do so can lead to lean/rich tuning conditions which can cause fuel wash and other fueling issues damaging the engine.

Misc. Notes:

Use Iron distributor gears only as our cams are Nodular Iron cores, not Billet. Do not use Bronze or Steel gears.

Use Standard fuel pump pushrods in GM engines, we recommend Pioneer #FPR-1936. DO NOT USE BRASS.

Old/Contaminated fuel can cause the engine to run poorly and make it difficult to tune. It can also contain debris that can get into the carburetor causing the floats to stick getting lodged in the needle/seat. If your engine is going to sit without being run for long periods of time, this can cause the seals/gaskets in the carburetor to go bad and may need to be rebuilt.