

Due to the EPA's mandate for zinc removal from most motor oils, proper flat tappet camshaft break-in procedure is more critical than ever before. This is true for both hydraulic and mechanical flat tappet camshafts. As a point of interest, the most critical time in the life of a flat tappet camshaft is the first 20 minutes of "break-in" during which the bottoms of the tappets "mate-in" with the cam lobes.

There are some oils with additive packages that are better for camshaft "break-in". These include: Shell Rotella T oil; Chevron Delo 400; and Mobil DELVAC oil. These oils are listed as diesel oils, but work great for flat camshaft "break-in". We also recommend the use of Crane Cams # 99003-1 Break-in lube or GM "E.O.S." (Engine Oil Supplement) Assembly Lubricant # 1052367. These should be poured over the lifters and camshaft prior to start up.

CAUTION: We do not recommend the use of synthetic oils for "break-in" because they are too slippery. This characteristic reduces the tendency of the lifter to rotate on the camshaft lobe and mate properly. Prior to installing the camshaft and lifters, it is recommended that the crankcase be drained and filled with new, clean oil. The oil filter should also be changed at this time.

Proper flat tappet camshaft break-in starts with the cam installation and includes the following steps:

1. Before installing the camshaft and lifters, wash them thoroughly in clean mineral spirits to remove the rust preventative that is placed on the cam before shipping. NOTE: As a "rule of thumb", always thoroughly clean any part before installing it in an engine. Never "assume" that the parts are cleaned before packaging. During shipping, packaging material can rub into the component surface and must be removed!
2. DO NOT "pump-up" hydraulic lifters before use. This can cause the lifters to hold a valve open during engine cranking, which will cause low compression. The low compression will delay engine start-up and is very detrimental to proper camshaft "break-in".
3. Lube the bottom of the lifters with the moly paste provided with the cam. Lube the sides of the lifters with oil. Lube the camshaft lobes with the moly paste supplied with the cam.
4. Install the camshaft, lifters and timing set. Lubricate the tips of the pushrods with motor oil before installation.
5. Set your valve lash or lifter preload. Try to minimize the number of times that you rotate the engine, as this can displace the moly paste from the lobes and lifters.
6. If possible prime the oiling system. When priming, rotate the engine at least one complete revolution to assure oil gets to all valve train components.
7. Preset the ignition to start the engine at a fast idle. Keep in mind that with many engines, when the timing chain sprockets have their marks at 6 o'clock on the cam sprocket and 12 o'clock on the crank sprocket that the number 1 cylinder is at TDC at the end of the exhaust stroke. For the ignition to fire the number 1 cylinder on start up, the number 1 cylinder must be at TDC at the end of the COMPRESSION stroke. That frequently requires rolling the engine through 1 additional revolution and putting the timing marks at 12 o'clock on both sprockets. Check your service manual or watch the action of your rockers to determine which stroke you are on. Both valves will be seated at the end of the compression stroke. The exhaust will be just closing at the end of the exhaust stroke.
8. Fire up the engine and bring the engine to a fast idle between 1500 and 3000 RPM. Do not worry about getting the ignition timing set perfectly at this time. Get the engine running fairly smoothly and vary the engine speed from 1500-3000 RPM in a slow, to moderate, acceleration/deceleration cycle. During this time, be sure to check for any leaks and check out any unusual noises. If something doesn't sound right, shut the engine off and check out the source of the noise. Upon restart, resume the high idle speed cycling. Continue the varying "break-in" speed for 20-30 minutes. This is necessary to provide proper lifter rotation to properly mate each lifter to its lobe.

9. Let the engine cool, and then drain the crankcase and properly dispose of the oil filter. Refill the crankcase with the proper viscosity and API service index recommended by the engine manufacturer. This should be a mineral oil, not a synthetic oil.

At this point the initial "break-in" is complete. You can drive the vehicle in your normal manner. We recommend changing the oil and filter after 500 miles. We strongly recommend mineral oils with flat tappet camshafts to help assure proper lifter rotation.. You might want to put another 5000 miles on the cam before switching to synthetic, if that is your preference.

ADDITIONAL INFORMATION

Spring Pressures: For extended camshaft life, flat-tappet cams should not be run with more than 330# of open valve spring pressure. Racing applications will often need to run more spring pressure at the expense of reduced camshaft life. In order to "break-in" a camshaft with high open pressures, the inner springs should be removed so that the open "break-in" load does not exceed 330#. The inner springs can then be reinstalled after initial "break-in" is complete.

Lifter Rotation: Flat tappet cams (both hydraulic and mechanical) have the lobes ground on a slight taper and the lifter appears to sit offset from the lobe centerline. This will induce a rotation of the lifter on the lobe. This rotation draws oil to the mating surface between the lifter and the lobe. If it is possible to view the pushrods during "break-in", they should be spinning as an indication that the lifter is spinning. If you don't see a pushrod spinning, immediately stop the engine and find the cause.

Never use old flat tappet lifters on a new cam. On flat tappet cams, the lobes and lifter bottoms mate together and if the lifters are removed from the engine, they must go back on the same lobe from which they were removed.

Roller cams do not require a "break-in" period like a flat tappet cam, but they should be washed in clean mineral spirits and coated with oil before installation. Roller lifters do not mate into the lobes and, therefore, can be used on different cams.

Big Block Chevrolets have an oil-priming idiosyncrasy. When priming a Big Block Chevy with a drill motor and priming tool, it is often necessary to prime for as much as 20 minutes (while rotating the engine) to get oil to all of the lifters and rockers. It is advisable to prime these engines with the valve covers removed so you can check to see oil coming out of all of the rocker arms before firing the engine. This last step is advisable on all engines, but particularly on Big Block Chevrolets.

As stated above, we do not recommend synthetic oil on flat tappet camshafts because it is so slippery that the lifters do not rotate as well as with mineral oil, and lack of rotation is "death to the camshaft". Additionally, if a vehicle using synthetic oil is stored for a lengthy period of time, the oil falls off the camshaft and the cam is "dry" during the engine start up. We recommend only regular mineral oil for vehicles that are only started occasionally or stored for prolonged periods