



November 2007

TB 2333R

Camshaft Break-In Using Zinc for Flat Tappet Camshafts

The AERA Technical Committee offers the following information regarding camshaft break-in using Zinc for flat tappet camshafts. The information in this bulletin warns about the reduction of Zinc in gasoline engine oils which has been traced to many camshaft and flat tappet lifter failures. This information should be considered for any engine that uses a flat tappet design and should be referenced before initial engine start-up. Also refer to AERA Technical Bulletin, TB 1935, to help prevent other possible component failures.

The current engine oils used by engine manufacturers in new car production are not applicable for initial flat tappet camshaft break-in. Those newer oils are less desirable than older formulations which have better wear additives than the current SM category oils. With the advent of roller lifters/cams as well as roller rockers, the need for those expensive elements has diminished. Emission laws have caused the reduction of Zinc and Phosphorus in the current oils because as they pass through the exhaust they plate themselves to the inside of the catalytic converter. This plating action does not create a restriction or increase back pressure but it renders the function of the catalytic converter useless. Eventually, this non function will turn on a check engine light for emissions failure.

Numerous AERA members report premature flat tappet camshaft failure during or after break-in. This has been an ongoing issue of late and not just with one brand or type of camshaft. In almost every case, the hardness or the taper of the cam lobe and lifter were within specifications. The reduction of Zinc in most of today's oil products and "advanced" internal engine design have contributed to a harsher environment for the flat tappet camshaft to survive. That reduction has greatly increased the potential for cam lobe failure during engine break-in. Diesel engine oils produced before January 2007 had a CI-4 oil designation and offer higher levels of Zinc and wear preventive additives than passenger car oils. BUT, after January 2007, the CJ-4 oil designation for new truck engine manufacturers mandates oils with a reduction in Zinc. Off-Road truck and racing engine oils have a higher Zinc content because the engines do not use catalytic converters. All of the oils listed below have flashpoints above 400° F.

Do not break-in a flat tappet camshaft and lifters using synthetic oil.

Delo 400 CI-4 15w-40	DelvacCI-4 15w-40	Rotella T CI-4 15w-40
Phosphorus 1375	Phosphorus 1120	Phosphorus 1326
Zinc 1376 PPM before 07	Zinc 1231 PPM before 07	Zinc 1499 PPM before 07
Zinc 1200 CJ-4, Jan 2007	Moly 35	Zinc 1200 CJ-4, Jan 2007
Zinc 1200 CJ-4, Jan 2007		

Adding additional Zinc for camshaft and lifter break-in by using GM Engine Oil Supplement (EOS) or using any supplant supplied from any of the aftermarket cam manufacturers. All camshaft manufacturers are aware of the reduction of Zinc and changes in engine oils formulations. For many years they have offered camshaft assembly lube and break-in lube for their products, so USE IT. Liberal amounts of this lube during assembly on all moving or rotating points will offer a front line defense as soon as the engine is rotated. GM recommends pouring a pint bottle of their EOS over the crankshaft before installing the oil pan.